THE NEWSWEEKLY OF INFORMATION SYSTEMS MANAGEMENT
April 10, 1989 · Vol. XXIII · No. 15 · 176 Pages · $2/Copy · $48/Year

SPECIAL REPORT: PC INNOVATORS

COMPUTERWORLD

INSIDE

3090 upgrade push is on again

BY ROSEMARY HAMILTON
CW STAFF

With few signs of a customer feeding frenzy for the MVS/ESA operating environment and the 3090 S models, IBM has shifted into high gear in an attempt to push its high-end package.

Last week, the computer giant dangled another batch of incentives in front of customers, including a new 3090 Model 380S, a midrange model that features an asymmetrical processing capability that will also be made available on other S models.

The asymmetrical capability lifts the constraint that required users to configure equal amounts of expanded storage and channels on both sides of a multiprocessing 3090 complex.

With the asymmetrical feature, users can install only the amounts they require on either side, saving money on expanded storage.

IBM also offered a promotional deal that gives users a 20% price break on central and expanded storage. The company said it will make available in June the system-managed storage function for MVS/DFP 3.1, another piece of the Enterprise Systems Architecture pie.

One less incentive

But along with the carrots, there was a stick. While enhancing the S model line, IBM also said it will do away with a growth incentive that in the past allowed new E model customers to receive a relatively inexpensive upgrade to a future S model.

The option will be withdrawn in June because IBM is "encouraging customers to go directly to S models," according to a company spokesman.

Customers contacted last week said they like the new features and price breaks but not enough to rush to ESA or the high-end mainframes.

Customer reaction mirrors the response IBM got with the last ESA lure it cast, which was less than two months ago. In

Continued on page 136

370 to land on Comdex tabletop

IBM has been quietly promoting a PS/2 add-on capable of running the full VM/SP operating system. Unlike earlier PC systems with VM options, the 7437 is a fully functional workstation alternative to the mainframe. It is expected to be in IBM's Comdex booth this week but is available only under special bids at $18,000 per unit. Story page 137.

	AT/370	7437
Performance	0.1 MIPS	0.7 MIPS
Real memory capacity	0.5M bytes	16M bytes
Virtual addressing	8M bytes	16M bytes
Maximum disk space	60M bytes	628M bytes
Host upload/download speed	Less than 100K byte/min	More than 2G byte/min
VM/SP application support	Some	All

SOURCE: IBM — CW CHART: FRANK C. O'CONNELL

Software drought slows up workstation growth spurt

BY DOUGLAS BARNEY
CW STAFF

The hardware price/performance battle between personal computers and workstations will get hotter this week, but the continuing lack of business-oriented software may hold back the workstation charge.

At Comdex/Spring '89 in Chicago, Intel Corp. is expected to show off its 80486 processor, whose performance begins where the 80386 leaves off. Also on tap for the show are systems built around the 33-MHz 80386 chip that challenge low-end workstations for millions of instructions per second ratings (see story page 37).

Among workstation vendors, Sun Microsystems, Inc. is not sitting still. In San Francisco, the firm will launch machines built

Continued on page 4

Xerox Star witness in display tiff

BY JULIE PITTA
and J.A. SAVAGE
CW STAFF

SAN JOSE, Calif. — Xerox Corp. finally appears headed to court over the rights to its graphical user interface, which many view as the forerunner of the acclaimed Apple Computer, Inc. Macintosh displays.

However, the copier giant has not jumped into the middle of the contentious dispute Apple is waging against Microsoft Corp.'s Windows for alleged violation of Mac copyrights. Instead, it will tangle with a small database management and interpretation products firm, Metaphor Computer Systems, Inc.

Technically, Xerox did not even pick this fight, as it was Metaphor that quietly filed suit late last month. But the smaller company claims it was merely taking preventive measures to ward off a copyright infringement suit that seemed imminent in the wake of two threatening letters from Xerox.

The Star interface, developed by the Xerox Palo Alto Research Center, has loomed over the battle between Apple and Microsoft. While Apple's suit claims Windows 2.03 infringes on copyrighted aspects of the Macintosh, industry analysts have questioned the validity of those

Continued on page 10

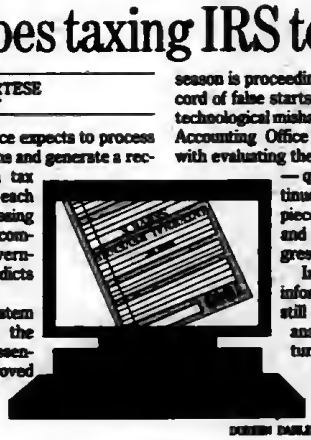
System woes taxing IRS to the limit

BY AMY CORTESE
CW STAFF

The Internal Revenue Service expects to process nearly 200 million tax returns and generate a record-breaking $1 trillion in tax revenue this year. But with each year, its outdated tax processing system is a step closer to complete overload, which a government watchdog agency predicts could occur as early as 1992.

Although parts of the system have been upgraded over the years, its structure is still essentially the same design approved by Congress in 1959 and put into place in the 1960s.

While the current tax season is proceeding smoothly, the IRS' track record of false starts, poor financial accounting and technological mishaps raises concern. The General Accounting Office — the organization charged with evaluating the agency's information systems — questions the IRS' ability to continue patching together the aging pieces of its computer operations and move forward with more aggressive plans.



DOREEN DABLE

In an age when on-line access to information is commonplace, it can still take the IRS several weeks to answer a routine question on a return. The magnetic tape or paper document with taxpayer account data must be at the central storage facility

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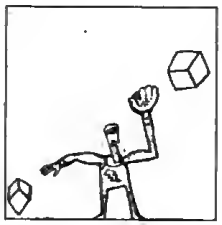
IN THIS ISSUE

Quotable

"The IRS' telecommunications network is basically airplanes and trucks."

JAMES WATTS
U.S. GENERAL ACCOUNTING OFFICE

On the state of the computer network at the Internal Revenue Service. See story page 1.



Managing the deployment of PCs within organizations. Page 71.

UPDATE

Future shock. In Japan, a typical 10th- or 11th-grade student logs nearly 40 hours of homework per week, compared with 15 for an average U.S. student, with the accent in Japanese high school studies increasingly on technical subjects. While U.S. students spend weekday afternoons on the ballfield, their Japanese counterparts get additional college prep training at *juku*, or cram schools. Only one Japanese teen in 20 fails to graduate from high school. Oh, yeah — the South Koreans view the Japanese, who are moving toward a standard five-day workweek, as lazy. Sushi, anyone?

You can sort it out in real time in CICS. Page 103.

EXECUTIVE BRIEFING

■ **It was a busy week for IBM** as it announced mainframes, electronic data interchange (EDI) and disaster recovery products and services. New incentives make moving to S models and the ESA operating system more attractive, page 1. Software translates a variety of business documents into standardized EDI formats, page 137. A disaster recovery service is now available on a limited basis with fees ranging up to $45,000 per month per machine, page 136. By the way, there are also new 9370s. page 136.

■ **Thrift shuts down IS operation** and farms the work out to EDS. Most employees take new jobs with the service bureau. The reasons are purely financial, page 8; Burger King's MIS director resigns after 18 months on the job, continuing the company's high turnover rate in that position, page 8.

■ **What to do with those old personal computers?** Companies are taking different routes: passing them to clerical employees, offering them for home use or donating them to charity. The risk is separating employees into haves and have-nots as PCs are distributed and redistributed through organizations. Page 71.

■ **Faster chips will be the news** at Comdex/Spring '89 this week, with the announcement of the Intel 80486 chip along with a half-dozen systems based on the 33-MHz 80386. But don't bother looking for software to exploit it, page 37. Planning pays off when buying PCs for high-end functions such as CASE, CAD and LAN server jobs. It's better to get what you need up front than add on later, page 71.

■ **Break down organizational walls** to get the most from information systems, say Nolan Norton consultants. They cite such successful examples as Federal Express' package-tracking system, which shares information among operations, customer service and accounting. Other examples are on page 61.

■ **Information systems are the key** to business success in the 1990s, an Arthur Young study says. But investments in technology have to be accompanied by organizational changes and training. Page 62.

■ **Hotel rooms are the next battleground** for strategic IS. Covia, the United Airlines affiliate, has joined American Airlines in extending its airline system to encompass hotel reservations. A consortium of hotels is also working on its own network. Page 16.

■ **Users in the news:** Fighter jet maker Northrop converts 16,000 pages of documentation into a six-ounce packet of microfiche, page 27. *The Baltimore Sun* shakes dependence on a single vendor and adopts industry-standard products for a high-speed page layout and graphics network, page 49. A rural Utah county government proves that leading-edge technology doesn't mean big city. The MIS manager uses 386s, fiber optics and multitasking PCs as part of a downsizing effort, page 44.

■ **IBM will now help handle troublesome projects** like designing or moving a data center, and some IS managers say the arrangement works well as long as the firm is treated as a hired hand rather than a friend, page 27. Users can now buy directly from IBM, and that may be an opportunity for IS. By leading the charge toward corporate standards and new technology and running an effective network, IS departments can expand their influence, page 19.

■ **Oracle goes on LANs** with the release of the database manager for Banyan's Vines, and an Oracle official hints at fundamental pricing changes on client-server networks. Page 14.

■ **The interface wars escalate** as Xerox finally files suit, claiming in tiny Metaphor rather than getting embroiled in the Apple-Microsoft spat. Page 1.

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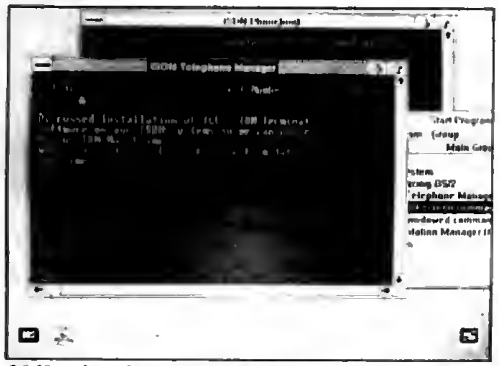
ISDN unit taps OS/2 features

BY ELISABETH HORWITT
CW STAFF

STAMFORD, Conn. — International Computers Ltd. North America introduced last week what it claims is the first Integrated Services Digital Network (ISDN) workstation to take advantage of the multitasking power of OS/2.

"A multitasking machine will be very useful with ISDN, particularly if you have a full-featured ISDN phone" that allows a workstation to communicate simultaneously over 64K bit/sec. and 16K bit/sec. ISDN channels, said Jeffrey Fritz, a data communications analyst at West Virginia University. The university currently sends voice and data traffic over 660 ISDN connections, Fritz said.

ICL's previously announced ISDN workstation provided some degree of multitasking through a proprietary extension to MS-DOS 4.0, which allows the operating system to assign up to 640K bit/sec. per task, said Ronald Aitchison, director of ISDN sales and marketing for ICL. One drawback of the older system is that while it could support up to 15 background tasks, it only supported one active foreground application at a time. Fritz was "fairly impressed" with ICL's proprietary workstation, he said. However, he added, "we felt it took a fair amount of time to paint a screen" as compared with a screen-sharing package called Carbon Copy from Meridian Technology, Inc., which the university runs on IBM Personal Computers connected over an ISDN B channel, he added.



OS/2 multitasking *allows up to 16 active sessions*

ICL's OS/2-based ISDN Information Integrator workstation potentially addresses Fritz's reservations, Aitchison said. The high-end Model 30 uses an Intel Corp. 80386 processor that incorporates an accelerator that boosts performance in moving data and graphics between screens and can cut response time by as much as two-thirds, Aitchison said. OS/2 multitasking allows the machine to support up to 16 active sessions, including active screen- and application-sharing with as many as eight users, he continued.

The Information Integrator supports MS-OS/2 Standard Edition 1.1 with Presentation Manager, ICL said. The company chose not to support IBM's OS/2 Extended Edition because it did not want to be limited to protocols that are supported by the Communications Manager, Aitchison said.

The high-end, 80386-based Model 30 is priced at $10,500; Models 10 and 20, which use 80286 processors, range from $6,000 to $7,000. The software alone is priced at $1,695. General release is scheduled for July 1.

Drought

FROM PAGE 1

around its Scalable Processor Architecture chip that will operate at about 12 MIPS, as well as more conventional systems using the Motorola, Inc. 68030. These announcements show that the price/peformance of high-end PCs and workstations is beginning to merge.

But while the staggering performance of workstations have made them hot, hot, hot in specialised markets, a dearth of mainstream software has so far kept them out of the PC mainstream, analysts and users said.

Free will

Software choices must increase in order to broaden workstation use, argued Ron Carran, an assistant manager at the technical computing group of Technicon Instruments Corp., which uses workstations from Digital Equipment Corp. Although PC applications can run on workstations using software coprocessors, hardware coprocessors or operating systems that run MS-DOS as a task, it is native-mode applications that will make all the difference, Carran said.

Workstation prices also need to come down to entice big-league developers into the market, he said.

Faced with lingering high prices and market fragmentation, the high-resolution workstation speed demons face tremendous difficulty catching up to PCs for general-purpose use. In 1988, only 7% of workstations were sold into the commercial environment; the other 93% went to technical users, said Vicki Brown, a workstation analyst at International Data Corp., a Framingham, Mass.-based market research firm.

The strength of PCs has always been a huge common base of applications that make them ideal for spreadsheet, word processing and database use. The still faster, more powerful Unix-oriented workstations lack solid software for everyday use. Commercial application software will not appear overnight, said Donald Lambe, manager of technical sector marketing at Data General Corp.

DG itself is developing mainstream workstation applications for use on workstations such as its 17-MIPS Aviion. Aviion, with 4M bytes of random-access memory, sells for $7,450, a price very similar to a high-end Intel 80386-based system.

Apollo Computer, Inc. has made similar promises. Users can soon expect software products from major PC vendors that support Apollo workstations, promised Mike Dillon, program manager of commercial markets at Apollo. However, he declined to be more specific and conceded that the problems that vendors such as Lotus Development Corp. and Microsoft Corp. have had in shipping PC products have crimped workstation plans.

There appear to be more forces working against workstation productivity software than for it. The recent Unix wars are likely to delay development of these packages further, as major PC software houses fret over which platforms to target, observers said.

With OS/2 stalled in the market, key software vendors are evaluating alternatives but so far have made scant commitments to Unix workstation platforms. Lotus has offered vague support of DEC's line of machines and provided a similarly ambiguous commitment to Next, Inc.'s system. Ashton-Tate Corp. has pledged a Decwindows version of Dbase IV but has given no shipping date, and Microsoft is waiting for the skirmishes to settle before it chooses a possible workstation platform, officials said.

New breed

But Microsoft Chairman Bill Gates has hinted strongly that OS/2 could be ported to some reduced instruction set computing architectures, which could bring a whole new breed of high-end productivity applications in the future.

OSF/Motif, which implements the "look and feel" of the OS/2 Presentation Manager and the application programming interface of Decwindows, may attract PC applications written for OS/2 to the workstation environment. Again, though, the timetable is unclear.

Like many others, PC software vendor Micrografx, Inc. will develop for the Presentation Manager first and then consider a move to OSF/Motif, President George Grayson said.

Senior writer William Brandel contributed to this report.

Tandem show of support

BY JEAN S. BOZMAN
CW STAFF

CUPERTINO, Calif. — Hoping to expand its role in large MIS shops, Tandem Computers, Inc. will announce this week that it is enhancing support for IBM mainframe and mixed-vendor local-area network environments.

Tandem's three new products address three environments: IBM's Systems Network Architecture (SNA), the international Open Systems Interconnect (OSI) communications standard and the Transmission Control Protocol/Internet Protocol (TCP/IP) standard.

Snax/CDF (Cross-Domain Facility), a new product for SNA communications, allows Tandem peer-to-peer communications with an IBM mainframe, said Jeff Tonkel, Tandem's manager of networking products.

Tandem OSI/AS (Application Services) reaches into OSI environments and allows applications programmers to address Tandem machines through the fifth layer of the OSI seven-layer architecture. Tandem is also updating an older TCP/IP product with one that supports Ethernet LANs and the Unix 4.3 from University of California at Berkeley's sockets interface.

Snax/CDF license fee prices start at $3,500; OSI/AS prices start at $2,500; TCP/IP product prices start at $4,000; and Expand/LAN software is available at no additional charge for those who have an Expand software license, Tandem said.

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IRS

FROM PAGE 1

and then shipped to the service center where the request was initiated.

"The IRS' telecommunications network is basically airplanes and trucks," said James Watts, associate director of the GAO's information management and technology division.

IRS officials believe the present systems for processing tax returns — Unisys Corp. computers run at the IRS' 10 service centers — can carry them through 1994. However, Watts views that as optimistic.

Still fresh in many minds is the memory of the disastrous 1985 filing season, when a switch to new computer systems at IRS service centers disrupted returns processing and hampered taxpayer services. Refund delays cost the IRS several million dollars in interest payments, and there were allegations that frustrated IRS employees were disposing of backlogged returns, said Dave Attinease, assistant director at the GAO's general government division.

Abandoned attempts

IRS history is littered with abandoned attempts to revamp its antiquated computer systems. As far back as the late 1960s, the IRS recognized the need to redesign its system and started planning for a modern system for the 1970s. But that costly attempt was killed by Congress, Watts recalled, and the IRS went back to trying to work with what it had.

In 1982, with its system near capacity, the IRS established the current modernization program, the Tax System Redesign. Management turnover kept three different plans from getting past the conceptual stage, according to the GAO. With the appointment of a new assistant commissioner in 1982, the IRS embarked on its most recent plan, which calls for incremental change. However, after sinking nearly $70 million into the effort, there is still no tangible solution in sight, Watts contended.

While the IRS has gained government support for its conceptual plan, the agency has yet to fill in the details of its future architecture. The massive overhaul required to take the agency into the 1990s will cost $3 billion to $5 billion over the life of the project, the GAO estimated.

Goal is on-line tax data

Tax System Redesign is basically designed to replace central tape-based master files with an on-line database system, employ optical technology to capture and store images of tax returns and put into place a communications network to allow on-line access and updating of taxpayer accounts. The objective is to put tax account data on-line, making it accessible to users from their workstations, according to Mark Cox, deputy assistant commissioner of the IRS' Information Systems Development group, which is responsible for the undertaking.

Under the plan, modernization will happen incrementally, with an interim architecture envisioned for 1994; the target architecture should be in place by the end of the decade, according to Cox.

The IRS is looking to certain leading-edge technologies for future applications. In an effort to tame the mountains of paper it handles, the IRS began exploring optical disk technology in 1981. Cox said the IRS plans to scan paper returns, which are currently stored at a cost of $34 million per year. Moreover, having an on-line image of the return will dramatically cut down response time.

An artificial intelligence program was started in the mid-1980s, and more than a dozen projects are exploring ways to apply expert system techniques to areas such as examination and service as well as returns processing. By the early 1990s, expert systems may help identify potential taxpayer audits and capture valuable expertise otherwise lost by departing staff.

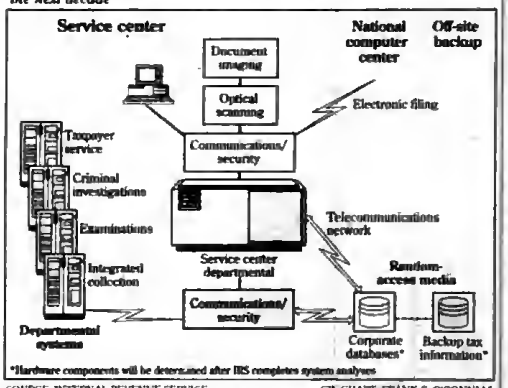
Cox points to more down-to-earth progress as well, including a move from tape reels to cartridges and the development of an on-line central database of taxpayer records that will replace the current system, which requires sending weekly batch updates to service centers.

The IRS is taking broader steps to improve its service. According to Carolyn Burstein, at the Office of Management and Budget, the IRS has embarked on a total quality management program designed to reduce errors and improve employee participation in decision making. "They're not there yet, but they are doing all the right things," she said.

The advent of a modern system of networked computers brings with it new concerns for the IRS — chief among them security. The GAO's Watts observed that today the IRS is protected by the nature of its antiquated system: Having virtually no telecommunications network gives hackers little opportunity for accessing data.

Glitch-free future?

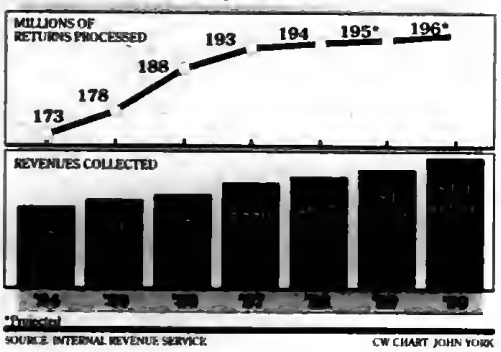
The IRS foresees a fully integrated tax processing system in place late in the next decade



SOURCE: INTERNAL REVENUE SERVICE — CW CHART: FRANK C. O'CONNELL

We all contribute

The IRS is experiencing a steady increase in tax return processing volume and in revenues collected for the government



SOURCE: INTERNAL REVENUE SERVICE — CW CHART: JOHN YORK

On-line returns

The IRS envisions a day when all tax returns are filed electronically from homes and businesses. But while its electronic filing program has made headway, poor quality software, procurement troubles and contractor delays have hampered its progress.

This year, an estimated two million tax returns will be filed electronically — nearly double the amount last year, thanks to an expansion of the service to include 36 states. Next year, the IRS hopes to expand the service nationally.

The program, started in 1985, allows individuals receiving a refund to file electronically through the services of one of about 4,000 qualified tax preparers. The return is then transmitted to one of two IRS centers and processed on a system consisting of an IBM Series 1, a local-area network of IBM and compatible personal computers, graphics workstations and optical disk drives.

Last year, however, a rushed schedule and insufficient software testing resulted in difficulties storing and retrieving electronic images of returns, and IRS tax examiners resorted to manual operations for some tasks. The defective software was to be replaced this year for an additional $2 million, but according to a GAO report, the software was not ready at the start of the 1989 filing season and will not be fully tested until the filing season is over.

The electronic filing system, like many IRS systems, was designed for interim use. But the IRS is now considering abandoning its earlier plans to develop a new nationwide system and instead has proposed spending about $20 million to expand the current system's capabilities.

The GAO questions whether the system will be able to meet long-term needs. Currently, only individuals receiving a refund can file electronically, and even then paperwork is needed to supplement the electronic system. IRS officials said that service to those who owe money to the IRS hinges on pending legislation that would allow taxpayers to pay by credit card. Also, the handling of business returns, which can get quite lengthy and complex, has yet to be resolved.

AMY CORTESE

Bank taps expert tool for payroll

BY ROBERT MORAN
CW STAFF

NEW YORK — Citibank NA has discovered that expert systems can trim time and increase productivity in the otherwise taxing process of issuing approximately 250,000 pension payroll checks per month.

Citibank built its Pension Disbursement On-Line System using IBM's Knowledgetool, a mainframe-resident knowledge-based tool. The 103-rule expert system adjusts tax withholdings based on the tax codes in different jurisdictions across the country, said Abhik Dasgupta, vice-president of advanced technology at the bank.

> "AN EXPERT system must be managed carefully, or it will take your CPU."
>
> ABHIK DASGUPTA
> CITIBANK

"The application fit well with expert systems technology," Dasgupta said, "because tax calculations are driven by rules, and tax rules are based on tables."

The batch processing system, which was built in six months and resides on an IBM mainframe running IBM's MVS/XA operating system, can process 120,000 checks in one evening. "We achieved a 14.3% reduction in processing," Dasgupta said. "We are now also able to issue specially requested checks in one day."

Dasgupta said the Cobol application runs under IBM's IDMS because the bank did not want a radical change in applications. He cautioned that each application should go through an in-depth analysis before being considered for expert systems technology.

"An expert system must be managed carefully," Dasgupta warned, "or it will take your CPU."

In addition to calculating taxes for the issuance of checks, the system also provides the bank's 520 clients with on-line access to management and tax reports via VSAM files.

Dasgupta said the pension disbursement system will serve as a platform for future developments and will likely be used for foreign and multicurrency services.

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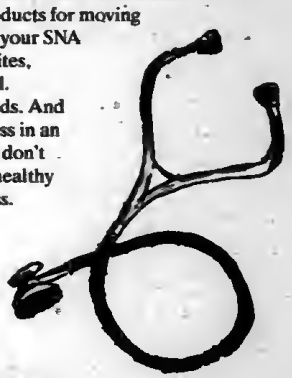

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8:30 a.m.	Registration and Coffee
9:00 a.m.	Seminar Begins
12:30 p.m.	Complimentary Lunch

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NEWS SHORTS

FCC's Patrick steps down

Dennis R. Patrick resigned last week as chairman of the Federal Communications Commission after five years with the FCC. Patrick, who will remain until a successor is sworn in, played a key role in FCC approval of price caps for AT&T long-distance rates and Open Network Architecture plans for regional holding companies. In other news, the FCC postponed until Wednesday a vote on AT&T's Tariff 12, which provides for custom voice and data networks within large organizations.

Wang confirms cutbacks

Word of departures from Wang Laboratories, Inc. approached flood level last week as the minicomputer vendor confirmed that close to 900 names have been deleted from the payroll over the past 90 days or so. Among the missing are 180 hardware field service employees laid off last month. However, most of the reduction has come from attrition, not layoffs, a company spokesman said. Meanwhile, Wang may have figured out the most alluring price of all for disaster protection: free. For the next six months, customers who sign up for the Wang Protection Package hardware services will also be covered for a year under Wang's Disaster Recovery Services. Wang said the deal amounts to a 15% discount on its hardware services plan.

HP extends service plan

Hewlett-Packard Co. last week expanded to worldwide availability a 24-hour, seven-day remote-diagnostics call-in service that it has been putting in place at selected response centers in the past several months. The goal is to give customers the same support in Singapore and Paris that they would get in downtown San Francisco, an HP official said.

HP backs three T1 switches

HP also announced support for three major T1 switch vendors, refuting speculation that it would acquire such a company. Citing the variety of T1 multiplexers at HP customer sites, an HP spokesman said, "Rather than get into the fray ourselves, we decided to form relationships with the market leaders." HP said its X.25 packet switches can operate with Network Equipment Technologies, Inc., Digital Communications Associates, Inc. and Timeplex, Inc. T1 switches. HP also announced six X.25 products.

DG sets network plans

Seeking to position its minicomputers as network servers for personal computers, Data General Corp. plans to release several connectivity products today. The offerings include a micro-to-mainframe package featuring menus like those of Lotus Development Corp.'s 1-2-3 and a data dictionary. DG also plans a statement of direction promising Token-Ring products.

3Com targets Japanese market

3Com Corp. — calling Japan one of the largest networking markets outside the U.S. — and its Tokyo distributor, Soliton Systems K.K., have formed a jointly owned operation to address that market. The venture, called 3Com/Soliton, plans to supply products called 3+Open Kanji. The first product, 3+Open Kanji LAN Manager, will ship this summer.

DEC adds net management options

Digital Equipment Corp. has unwrapped two additions to its network services. The Local Area Interconnect Service is said to improve support for customers' local configurations of cable plant and interconnect hardware. An on-line database provides real-time access to that equipment inventory for 24-hour status of network elements and support for fault isolation. DEC's Wide Area Interconnect Service now sports an alarm feature designed to monitor various circuit characteristics and a hot-spare option for remote switching of a customer's spare modem.

Burger King MIS VP resigns

BY ALAN J. RYAN
CW STAFF

MIAMI — The revolving door to the highest MIS office at Burger King Corp. is spinning again.

Bob Forte, who held the position of vice-president of MIS for 1½ years, setting into motion aggressive systems plans for the company-owned restaurants, resigned last month for personal reasons. Last week he said that he has not yet decided on any future job plans.

Forte has been replaced by John Foley, a six-year Burger King veteran, who most recently held the position of vice-president of finance and administration at Distron, the distribution arm of Burger King.

Foley was formerly Burger King's San Francisco region controller and was the director of planning and control systems here. Prior to working at Burger King, Foley was vice-president of finance and administration at A&W Restaurants, Inc. in Detroit.

Forte's resignation was not related to last week's reorganization announcement, which eliminated 100 positions at the Burger King headquarters and cut out another 450 jobs throughout the 32 regional offices of the fast-food chain, a company spokesman said.

"I don't leave with any animosity or any negative feelings at all," Forte said from his home last week.

In a *Computerworld* interview last fall [CW, Nov. 14], Forte discussed plans to computerize both front- and back-room

Burger King's Forte

operations at 300 of the 750 company-owned Burger King stores. Those plans were set to begin in January. There are approximately 5,000 Burger King stores systemwide.

Last week, Forte said he did not expect his departure to have any negative impact on those plans.

"I see a very positive and bright future for the MIS opportunities that were before us. Those plans are going to move forward as quickly as I would have expected had I stayed on," Forte said.

"There definitely is a commitment to move technology into the restaurants and improve the operations through information technology by the new ownership" of Burger King, he continued. Pillsbury Co. spun off Burger King early last November in its attempt to fight a $5.7 billion takeover by Grand Metropolitan PLC. Pillsbury succumbed to the takeover in December.

Forte, who had been employed by Burger King for two years after moving from Pillsbury, admitted that the top MIS post at Burger King traditionally has had a high turnover rate but blamed it on the instability of the company's former management team.

"There has been a fairly long history of rapid turnover at the top at Burger King, and I think that has impacted the MIS organization," Forte said. "I don't see that happening now. I think the Grand Met people are solid. They have made a long-term commitment to the business, and I believe you're going to see very strong leadership coming from Burger King."

EDS supplants Meritor Financial Group's IS

BY CLINTON WILDER
CW STAFF

PHILADELPHIA — Financially battered by the savings and loan industry crisis and its own overexpansion, Meritor Financial Group is spelling relief E-D-S.

Last week, Electronic Data Systems Corp. officially began work on a 10-year contract to handle all data processing and check processing for Meritor, which with about $10 billion in assets is one of the largest thrifts in the U.S.

Meritor's 300 information systems employees were offered jobs at EDS, and "all but a very small number accepted them," said Laurence Liss, formerly Meritor's senior vice-president of IS and planning control and now chief liaison to the EDS account management team.

Meritor Chief Information Officer Larry Betsinger, however, will not be staying on. He will leave the firm early next month to pursue other opportunities. Betsinger was traveling last week and could not be reached for comment. Liss formerly reported to Betsinger.

EDS' general policy in major processing contracts is to keep employees in their previous jobs, assess needs after an unspecified period and possibly offer the workers other jobs within EDS, spokesman Roger Still said.

"We want the initial transition to be as smooth as possible, but then there may be some positions that don't make sense," he said. "We're not afraid to move people around, though we try to eliminate the need for them to relocate geographically."

Meritor's decision to farm out its IS function was purely financial, said Liss, an 18-year veteran of the thrift. Top management made the decision last October, put the contract out for bid and chose processing services giant EDS last month. The thrift expects to save $40 million to $50 million over the course of the contract.

Liss predicted that many other financially strapped savings and loan institutions with in-house IS may follow the same path. "The phenomenon is purely one of economies of scale," he said. "EDS can do it for less money than we can. In the financial services area, where there's a fair amount of homogeneity of applications, they're doing the same things for a lot of different people."

Meritor's move follows the lead of two much larger companies in other industries to farm out their IS to processing services vendors: Enron Corp. also went with EDS, and Southland Corp. contracted with Affiliated Computer Systems, Inc. [CW, Nov. 14].

The possibility that EDS may consolidate Meritor's IS operation with other EDS accounts in a different location "is up in the air at this point," Liss said. But the operations will remain in downtown Philadelphia at least through the end of this year. "Our facility is larger than we need," Liss said.

The *Computerworld* bulletin board has been enhanced with an open forum for general discussion and E-mail to our staff and other registered bulletin board users. Call and fill out our on-line survey so we can add features that interest you. We now have three lines: 508-626-0214 and 508-626-0235 (up to 2,400 bit/sec.) and 508-626-0166 (up to 9.6K bit/sec.).

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Motorola's 68030 clocked at 50-MHz clip

BY JULIE PITTA
CW STAFF

AUSTIN, Texas — Motorola, Inc. said last week that it has boosted the speed on its 68030 chip to 50 MHz, making it the fastest complex instruction set computing (CISC) processor currently on the market.

According to Motorola, the chip offers 12 million instructions per second of performance.

The introduction of a faster 68030 is the second microprocessor announcement from Motorola recently. Two weeks ago, Motorola unveiled its 68040, a microprocessor that combines floating-point and memory management functions on a single chip.

The performance race is slated to intensify at Comdex/Spring '89, when Motorola rival Intel Corp. is expected to launch its 80486 microprocessor.

Sources have said the 486 will run at 30 MHz; Intel has declined to offer any details on the long-awaited chip.

System vendors are rushing to keep pace with the new chip introductions. So far, only Hewlett-Packard Co., Sony Corp. and Apollo Computer, Inc. have adopted the 33-MHz version of the 68030, which was introduced several months ago.

Jeff Nutt, Motorola technical marketing manager, said he anticipates the 50-MHz 68030 will be adopted by systems manufacturers that are more performance-conscious. "Some, like Apple, build in volume, and they're looking for the optimum price/performance point rather than raw performance," he explained.

Xerox Star

FROM PAGE 1

copyrights because Star formed the basis of its Macintosh graphical user interface. It has been widely anticipated that Microsoft will challenge the copyrights on that basis.

In late 1988, Xerox told Metaphor, which utilizes a proprietary operating system using icons (see story page 37), that it would need a license from Xerox. In February and March, that threat was backed up with two letters. As a result, Metaphor last month sought a judicial ruling that it has not infringed on any Xerox copyrights.

Xerox declined last week even to confirm that the Star interface is the crux of its complaints with Metaphor. Nevertheless, "this raises some questions about who owns that interface," said Peter Rogers, an industry analyst at Robertson, Colman and Stephens. "The whole thing is starting to look like range warfare."

Rogers said the conflict between Metaphor and Xerox could add further confusion to Apple's lawsuit against Microsoft. "It plays into Microsoft's hands, since it may be that the technology belongs to someone other than Apple," he said.

Founders' tale

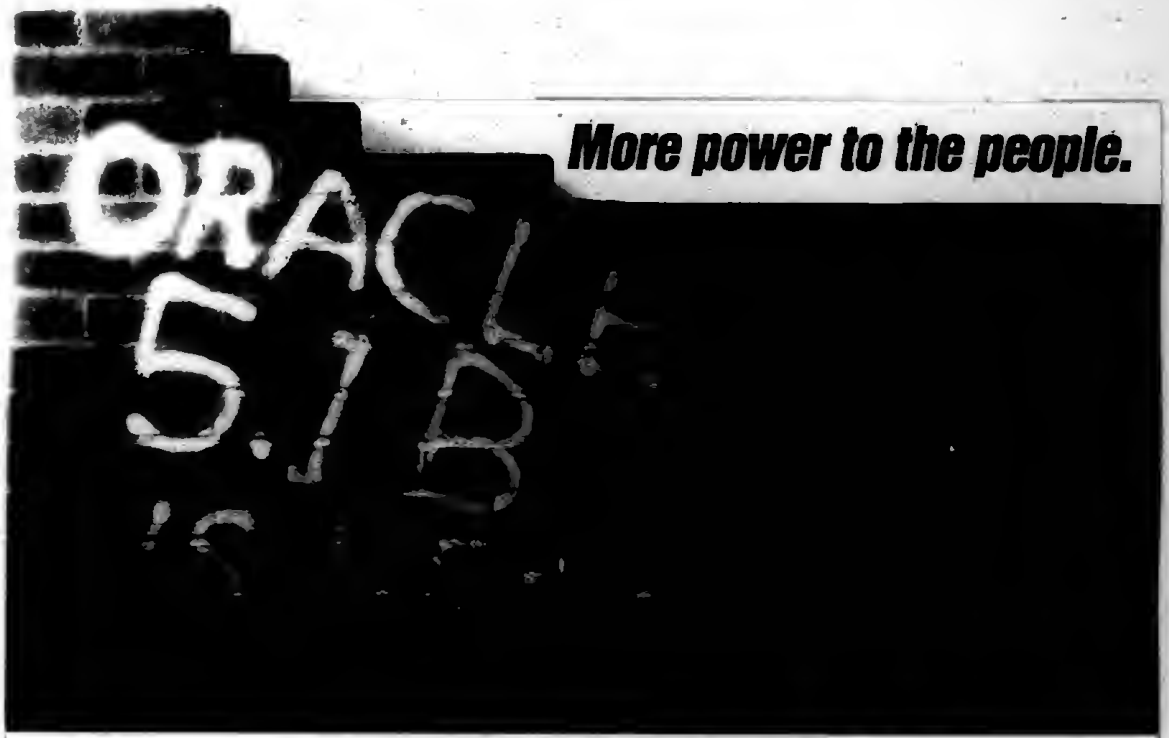
Two of Metaphor's founders, Don Massaro and Dave Liddle, were Xerox employees when they formed Metaphor in 1982. Liddle was responsible for Xerox's Star development team.

According to court documents, the two men tried to interest Xerox in backing their start-up, informed Xerox of Metaphor's products and provided the company with a business plan. Xerox declined to invest in 1986. Then, late last year, it informed Metaphor of its interest.

"They didn't say, 'Stop this or we'll kill you,' " Liddle said. "Their [communication] was not specific on what is being infringed upon."

Xerox patent attorney Ronald Zibelli would not confirm that it is the Star interface that is in dispute, only that Star is an acronym for an early Xerox computer. "It is that type of software," he said.

Despite the legal filing, Liddle said that both sides are engaged in settlement negotiations.



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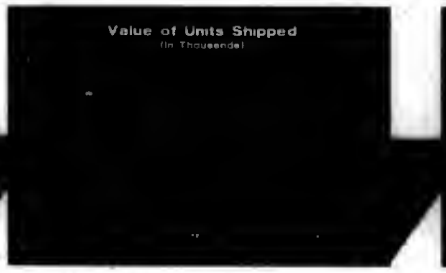

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Banyan, Oracle team up on server option

BY PATRICIA KEEFE
CW STAFF

Banyan Systems, Inc. and Oracle Corp. unveiled Oracle Server for the Vines network last week, much to the relief of Banyan users struggling to control mounting traffic volumes attributed to cumbersome personal computer databases.

Available in May, Oracle's SQL port to the Virtual Networking Software, or Vines, network server is based on Oracle Version 6, which features optional transaction processing. The port is also said to be tightly coupled with Streettalk — the global naming service unique to Vines — and Vines' security.

Oracle Server for Vines runs on Intel Corp. 80386-based PCs. The server software costs $4,999 and will support client applications running under MS-DOS, Unix and Apple Computer, Inc.'s Finder.

The announcement raised some pricing issues. Many users are pressing for server licensing of network software and do not want to pay separately for each network client.

Rack 'em up

A large network with several users could quickly rack up costs, complained Richard Henry, a user on a 300-node Banyan network operated by a West Coast-based electronics organization. According to Henry, linking PCs to database servers could cost him as much as $1,200 per node.

"I could buy a mainframe at that price," he concluded.

"We'll certainly not pay mainframe prices for the technology," added Larry Stouder, manager of technical development at New York-based Continental Grain Co., which has a domestic Vines network with about 400 nodes and 18 servers.

Oracle said it does offer volume discounts but did not say when those would kick in. Bruce Mitchell, Oracle's director of marketing, added, "We are going to see some fundamental changes in regard to pricing due to client/server architecture." He did not elaborate further.

Pricing issues aside, some Banyan users were particularly interested in the enterprisewide networking implications of Oracle's port to Vines.

"We have't been able to do a thing in terms of wide-area networking with PC database applications such as Paradox, Dbase and R:Base," said Jonathan Oski, a technical engineer at Bank of New England in Boston.

Currently, Bank of New England's multistate Banyan network has 52 servers and more than 1,000 nodes. "There'a no way today that we can have users from two states share a database. A traditional PC database, even on a network, is really just a shared hard disk," Oski said.

The advantage of an SQL-based database server, according to John Cornell, a network specialist at Pacific Gas & Electric Co. in Diablo Canyon, Calif., is that it cuts down on network traffic by confining most of the processing and searching activity to the server vs. downloading everything to the PC.

This is key in an enterprisewide network, because many WAN connections tend to have a smaller bandwidth than the local networks.

"You can't use Rbase or Dbase over a WAN," Cornell said. He said that his network has several thousand users and 120 servers, 75 of which are attached to a WAN.

While Oski has yet to evaluate the Oracle server, be noted that the fact that Oracle runs native on Vines, uses Streettalk and runs on a variety of platforms "is a real big plus."

In addition, Oski's IBM shop uses DB2, with which Oracle Server for Vines will be able to communicate, according to Banyan.

USAA's CEO cited for systems role

BY MICHAEL SULLIVAN-TRAINOR
CW STAFF

On his first day as chief executive officer at the United Services Automobile Association (USAA), Robert F. McDermott, a retired brigadier general, ordered the burning of some of the company's paper and microfiche files to prove a point.

"I wanted to get rid of paper," he said. "All our files were lying in folders everywhere, and access to any particular piece of paper was only possible after a month of searching. So I started burning the files to demonstrate my commitment and to show there would be no turning back."

That was 20 years ago, and USAA has never turned back. McDermott's determination to use technology — particularly image processing — to drive USAA's growth earned him Gartner Group, Inc.'s 1989 Excellence in Technology award.

The purpose of the award is to recognize executive leadership in technology use for sustained strategic advantage. A panel of 10 chief information officers selected the winner. Previous winners were AMR Corp. CEO Robert L. Crandall, Federal Express Corp. CEO Frederick W. Smith, Aetna Life & Casualty Vice-Chairman William O. Bailey and American Presidents Companies Ltd. CEO Bruce Seaton.

JOHN MARTIN

USAA's McDermott

McDermott received this year's award Tuesday in New York at a Conference Board, Inc. seminar on information management in the 1990s. The CEO's key role in advocating strategic use of information systems was a central theme of the seminar.

"With technology becoming the key factor in achieving strategic competitive advantage, the responsibility for meeting the pervasive demand for technological support cannot fall solely to the information services executive," said John H. Panabaker, chairman of the board of Mutual Life of Canada, one of the keynote speakers.

Buddy-buddy

Panabaker described the need for a partnership between MIS and senior executives. But the partnership will not happen without leadership from the top and an understanding of its necessity, he added.

McDermott demonstrated such leadership by making USAA the first insurance company to pioneer IBM's image-processing technology, the Imageplus system (CW, May 30, 1988). Part of a $100 million automation project that began in 1981, the image-processing system allowed the company to get rid of 99% of its original paper documents. An estimated 160 employees once involved in file handling are being retrained for other positions, according to Donald R. Lasher, president of USAA Information Services.

McDermott credited the use of image processing, expert systems and networks with reducing the cost of policy processing. USAA's underwriting expense ratio (the cost of underwriting policies divided by the value of premiums written) is 9%. The nearest ratio for competitors in the same industry is 13%.

While most of the large insurance companies are considering major image-processing projects, USAA is the first to fully implement imaging to process all the company's files. Other companies are stymied by an inability to cost-justify image systems because the short-term payback does not match the up-front investment costs.

Covia tosses its hat into hotel reservation service arena

BY ELLIS BOOKER
CW STAFF

ROSEMONT, Ill. — Airlines are jostling to extend their reservation systems beyond the tarmac and to the front door of the traveler's hotel room.

Covia, the United Airlines affiliate that operates the Apollo network, launched its hotel reservations product last week, jumping into an arena already staked out by American Airlines.

Covia Reserve will use the Apollo network but will be an independent product marketed directly to hotel chains, said Paul J. Mercurio, managing director at Covia Reserve. In March 1988, American affiliate AMR Information Services announced plans for AMR Confirm, a reservation system for hotel and car rental businesses. Mercurio said Covia Reserve will be targeted at the 20% of the market that consists of chains with between eight and 50 hotels.

Covia's Mercurio

"We can give them an interface to all the travel agents using the Apollo network or other reservation networks," Mercurio said. He noted that about 30% of all hotel bookings are made through airline computer reservation systems (CRS) such as Apollo but that many smaller chains lack centralized reservation systems or on-line connections to the approximately 30,000 travel agencies worldwide.

Covia Reserve will be available immediately; that may give Covia a jump on AMR, which reported in January that it had completed the design phase of AMR Confirm. AMR, which is developing its hotel reservation network with Budget Rent-A-Car Corp., Hilton Hotels Corp. and Marriott Corp., has a 1991 target date to bring AMR Confirm on-line.

If Covia can make its network operational immediately as planned, "it would be a major competitive advantage," said International Data Corp. President Thomas E. Swithenbank. "The real question is whether they can make it attractive for smaller chains and then put pressure on the larger chains to interface to it and pay a transit charge."

John Heilner, vice-president of industry sales at New York's The Thomas Cook Group, the third-largest U.S. travel agency, said any service that promises to improve the efficiency of the hotel reservation industry would be welcome: "From our standpoint, anything that can make us more efficient is a plus for our clients and a plus for hotels."

Meanwhile, a group of 15 major chains is developing its own communications network. The Hotel Industry Switch Co., formed last October in a joint project with Murdock Electronic Publishing, Inc., is developing Ultraswitch for simplifying communications links between hotel and airline CRSs (CW, Nov. 28). Each hotel will have a single interface to Ultraswitch, which would establish multiple links to the various airline CRSs.

Final technical details of Ultraswitch are being set, and the 15- to 18-month development of the $8.5 million project is on track, said Jerry Petit, executive vice-president and chief operating officer of Thisco member Quality Inns International, Inc. in Silver Spring, Md.

Confirmed

Covia Reserve will be based on the reservation system used by Westin Hotels & Resorts, developed 10 years ago by United Airlines reservations group.

At the hotels, Covia will network IBM Personal System/2 Model 50s using Token-Ring networks and provide a gateway into the Covia Reserve database. Existing hotel property management systems will be provided a gateway into the database.

Covia Reserve now resides in a partition of the IBM 3090 200E Transaction Processing Facility hosts in Denver, but Paul J. Mercurio, managing director of Covia Reserve, promised a second-generation product in 1990 that will be implemented on an MVS host.

HP pact may shield 3Com from takeover

BY PATRICIA KEEFE
CW STAFF

SANTA CLARA, Calif. — Speak softly and carry a big stick. It worked for Teddy Roosevelt, and it may work for 3Com Corp.

There's more to the recently trumpeted alliance between 3Com and Hewlett-Packard Co. than meets the eye. Buried in fine print under the backslapping technology, marketing and service agreements is wording that could erect an imposing barrier to any attempt to take over 3Com.

In late February, the two vendors strengthened their longtime relationship with a series of joint development and OEM pacts cemented by an agreement that allows HP to purchase up to 10% of 3Com's stock, based on certain sales factors [CW, Feb. 27].

In the aftermath of that announcement, analysts wondered whether the deal was a prelude to an HP buyout or merely insurance for 3Com.

What the two vendors did not reveal is spelled out in 3Com's 8K Report, filed with the Securities and Exchange Commission Feb. 27. The language appears to ensure that HP has right of first refusal should 3Com feel inclined to entertain any buyout or merger offers.

3Com Chairman William Krause confirmed that the measure is a poison pill of sorts. However, he insisted that 3Com has no plans to forfeit its independence, which he said adds to the company's value. "It's obvious that 3Com is worried about someone taking them over. Every week, one of those [LAN] guys is up for sale," said one industry observer.

According to the 8K Report, in the event that 3Com decides to accept a tender offer for more than 25% of its outstanding voting stock or a similar proposal for a merger or acquisition that would transfer control of 3Com, it must give HP a chance to counteroffer.

Further, if HP offers a higher price per share, 3Com must accept or recommend to shareholders that they agree to HP's offer.

Other terms of the agreement mandate that once HP's holdings reach 8% of 3Com voting stock, 3Com's board of directors will expand to make room for an HP representative. In return, 3Com gains the right of first refusal on sales by HP of 3Com stock.

The agreement expires after seven years or can be terminated by either party after three years upon six months notice.

"This is going to sound egotistical, but computer network companies represent a balance of power. If 3Com were to become part of another computer company through an unplanned or undesirable mechanism, that balance would be upset," said Krause, a former HP executive.

Krause claimed that HP and Digital Equipment Corp. have made it clear to 3Com, both in words and through their actions, that they would like the network supplier to remain an independent company.

Although Krause was quick to quash any talk of merger, he said more minority investments in 3Com can be expected.

THERE'S MORE to the recently trumpeted alliance between 3Com and Hewlett-Packard Co. than meets the eye.

Following IBM, Amdahl raises list prices 5%

BY J. A. SAVAGE
CW STAFF

Amdahl Corp. raised list prices last week on its mainframes and high-end storage processors by 5%. IBM started the price spiral late last month.

But while list prices may be rising, they may have little to do with selling prices. In February, Ed Thompson, Amdahl chief financial officer, said that in the field, the company was having to discount its products due to competition from IBM.

"IBM Credit Corp. has been very aggressive. It's being used as a discounting device on a tactical basis," Thompson said.

Last week, Thompson said "it's too early to tell" whether the price increases will make a difference in actual sales prices. He maintained that list prices could be raised concurrently with further discounts.

The price rise affects all mainframes and the 6100 storage processor. Amdahl's high-end mainframe, the 5990 Model 1400, went from $11.3 million to $11.87 million. Amdahl maintained that the price hikes still keep the company's products about 15% lower than comparable products from IBM.

Stellar launches low-cost minisuper performance rival

BY JAMES DALY
CW STAFF

NEWTON, Mass. — Graphics supercomputer maker Stellar Computer, Inc. began circling the struggling minisupercomputer market last week with introductions that included a machine reportedly capable of offering a minisuper's performance at less than one-third the price.

It also announced 12% to 15% price cuts on its GS1000 Graphics Supercomputer as a result of memory component price reductions, among other factors.

Although the graphics supercomputer market has not taken off as quickly as Stellar had hoped [CW, Feb. 6], the new products and price cuts could draw much-needed dollars into the coffers of the company, which is reportedly investigating another round of investor financing.

The DS1000 Departmental Supercomputer uses a parallel multiprocessor architecture to sustain a processing speed of 25 million instructions per second and as many as 40 million vector and scalar floating-point operations per second, the firm said. Stellar said the machine has one goal: to replace minisupercomputers and networks of workstations.

The company also unveiled the Stellar X Terminal, which supports the X Window System as well as Transmission Control Protocol/Internet Protocol. The machine is capable of providing simultaneous access to multiple applications from multiple hosts to providing windowed text and graphics, Stellar officials said.

Stellar also announced support for a variety of Digital Equipment Corp. VAX/VMS compatibility features, including Decnet Phase IV and VMS DCL emulation, which allows users to enter DCL commands in place of Unix commands. Complementing the VMS DCL emulation is a version of EDT Editor.

Pricing for the Departmental Supercomputer starts at $83,800, and the X Terminal costs $3,100. Both are currently available. Decnet support is priced at $3,900, and VMS DCL emulation and EDT Editor support are $1,300 each. All have second-quarter availability slated.

OSI chosen in Tymnet net management

BY ELISABETH HORWITT
CW STAFF

SAN JOSE, Calif. — McDonnell Douglas Network Systems Co. subsidiary Tymnet plans this summer to release the initial version of an integrated, multivendor network management system based on Open Systems Interconnect protocols, a company spokesman told *Computerworld* last week.

The product, which still has no official name, will run on a Sun Microsystems, Inc. workstation and bring several network management applications — including traffic monitoring, troubleshooting and diagnostics — under the same graphics-based user interface and Sybase, Inc. database management system, said Tymnet marketing manager Curt Bauer.

The initial release will manage Tymnet's public packet-switching network and private customer networks based on the vendor's CCITT X.25 packet-switching product line, Bauer said. A second release, scheduled to be out by the first quarter of next year, will support other vendors' equipment through the OSI Common Management Information Protocol (CMIP), he added.

Sign up

Tymnet recently applied for membership in the OSI Network Management Forum, whose members agreed last year to adopt CMIP as a common interoperability standard. It will work with some vendors to provide greater integration than is currently supplied by CMIP, Bauer said.

Another goal for the system is to provide information exchange with IBM's Netview. Tymnet's Tymview sends network management data to Netview via IBM's Netview/PC. An upcoming release will support Netview/PC 1.2, the OS/2 Extended Edition version of the interface. However, Tymnet's new network management system may provide a direct link to Netview without going through Netview/PC at all, Bauer said. Another planned feature will allow users to find out the status of their ports and traffic on Tymnet's public data network, Bauer said. "We want to give users real-time access to that information," he said.

The initial release will poll network devices to collect statistics, events and configurations, filter alerts so that managers receive only critical events and keep track of the location and configurations of Tymnet and non-Tymnet equipment on the network, Bauer said. It will be priced at about 10% of the user's investment in Tymnet equipment, Bauer said.

IBM redefines MIS alliance

IBM WATCH

SAM HARVEY

After three decades of seeing IBM as a staunch ally, some MIS managers are wondering whether the company is still 100% behind them. The reason: IBM's new effort to sell directly to end users.

The rationale behind the new sales pitch was expressed by George Conrades, head of IBM's U.S. Marketing and Service group, in last November's *Computerworld Extra.*

The buying decision, Conrades said, now sometimes includes end users, people "... who are acquiring and implementing technology across the firm, be they department heads or individual users themselves."

To an MIS director who has been struggling for years to build the discipline and capability required to implement large transaction systems successfully, this change can be hard to take.

The new sales approach is led by a national account team assigned to offer products at different levels of the company. Some team members focus on selling large systems to MIS, while others present small systems to end users. While there is an effort to coordinate the approach with MIS, users often make their own buying decisions.

Great expectations

"When users buy a PC, they have high expectations," says Joe Petty, vice-president of MIS at Conagra, a large IBM account. "They want access to the company's databases. MIS is responsible for providing that, and there are problems, but IBM works closely with us to provide coordination across our network."

Ever since the early 1950s, MIS has worked with an IBM that has acted as a partner in selling systems benefits to top management and then worked closely with MIS on implementation. Strong loyalties were established between IBM and MIS.

The bond is still strong, but technological advances have changed the environment. Computation power that far exceeds the early large mainframes comes now in personal computers. High-level "English language" programs and packaged systems make it possible for users to install their own applications.

New technologies enable new capabilities, such as graphics, computer-aided design and manufacturing, image processing and expert systems. In many cases, these systems reside outside the MIS area. Faced with competitors' marketing products to support these applications, IBM has no choice but to sell directly to users as well. In doing so, the company appears to be contributing to the "Tower of Babel" that is caused when separate user departments acquire technology without regard for corporate standards or connectivity.

It will only be a matter of time before users recognize that systems integration is required. The ability to communicate between the related functions of an organization is the key to increased productivity. A complex computer and communications infrastructure is required to accomplish this goal. Such an infrastructure does not happen by chance. The question is, who will be in charge of constructing and maintaining it?

In a few cases, business executives have already decided that a third party, such as a systems integrator, can handle the job. General Motors Corp.'s use of electronic data systems is the most prominent example. IBM and other companies are competing in the systems integration market to meet the needs of such firms.

MIS managers must recognize that IBM's pitch to departmental end users can be turned into an opportunity. Action must be taken to do the following:

- Facilitate the development of plans with end users. Enterprise systems — which cross traditional business lines, transcend different levels of systems and integrate functions that were previously separate — cannot be successfully implemented without tracking against a well-developed plan.
- Provide leadership in focusing information systems technology to increase the productivity of the business.
- Provide leadership in evaluating new technology. The task requires expert knowledge of the technology and a clear understanding of the business.
- MIS should have management responsibility for the operation of the computer and communications network and the custody of all data on the network.

Putting it all together is not easy. The challenge is in the systems integration of the parts. Partnerships are to be encouraged, individual initiative is great, cooperation is essential, but, in the final analysis, somebody has to be in charge.

In IBM's view, that person is still the MIS executive. "MIS has an important role to play because most business solutions, once identified, drive across functional applications," Conrades said. "The MIS director is responsible for the network and more and more for the management of the data within the firm."

Harvey is president of Business Research, Inc., which provides technical and management services to Fortune 100 firms and is based in Stowe, Vt.

EDITORIAL

Say no to LBO

HAVE YOU EVER wondered why corporations in other countries seem immune from the agony of today's hostile takeover mania?

Recently, a West German executive answered this $64 billion question this way: "We have laws against them. They aren't good."

In the name of free enterprise in the U.S., however, the highly leveraged hostile buyout is business as usual.

Until recently, the computer industry had largely escaped the LBO chaos. Then last fall MAI Basic Four, with the backing of junk-bond king Drexel Burnham, launched what first appeared to be an absurd effort to take over Prime Computer (MAI is a fraction of the size of billion-dollar Prime).

From ethical, economic and "what's just plain right" points of view, there's plenty wrong with these kinds of buyouts. They are also inscrutably legal, and that's what must be changed, or at least closely examined.

This is not to say there aren't compelling arguments in their favor. Typically, a company is bought out by offering shareholders some premium for their shares. The purchase price is funded with so-called junk bonds, which are financed a number of ways, such as selling off certain parts of the company. But in the end, the shareholders make a profit. And that's what free markets are all about, right? You take a risk on an equity investment and the reward is your return.

It can also be argued that there are efficiency gains realized when the company is chopped up and sold off, that the sum of the parts is more viable and productive than the whole.

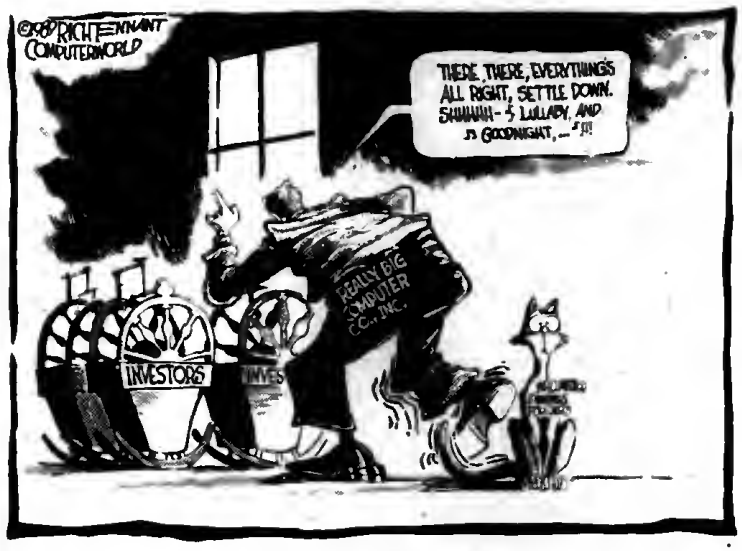
But as is becoming so clear in the case of junk-bond traders from Drexel and elsewhere, the invitation to fraud and abuse in LBO schemes is enormous. The greatest economic benefits often end up in the hands of a very small group of speculators, not in the pockets of the average investors, whom our securities laws are really designed to protect.

For the companies under hostile assault, millions of dollars that could be earmarked for product development, customer support and the like flow to high-powered lawyers. Thousands of jobs are lost — not all in the name of efficiency — to trim expenses for the buyout defense. And for those left behind, like the MIS survivors, fear, uncertainty and doubt reign supreme.

Meanwhile, billions of investment dollars flow from equity markets to the junk-bond market, putting greater downward pressure on stock prices and creating more buyout candidates.

If it were possible to weigh the total benefit of this kind of perfectly legal activity against the cost both to individuals and to institutions, the greater potential is clearly for a net loss to society, at least in today's unregulated environment.

If nothing else, vendor groups such as Adapso and Cbema should begin an active dialogue on this issue with our lawmakers. They might see in these activities what the West German executive saw: "They aren't good."



LETTERS TO THE EDITOR

Not quite so high

I would like to clarify comments I made in "Can MIS pros handle sales?" [CW, March 6]. I'm quoted as saying ". . . a good salesperson working for a mid-size company can expect to make $100,000 to $175,000 per year."

What I meant was a top-flight individual getting into systems integration at the very high end, controlling a business and bringing in a minimum of $1 million per month, could expect to earn $100,000 to $175,000 per year. A good salesperson working for such a company can anticipate earnings in the $60,000 to $100,000 range.

Compensation at Amtec Systems is usually better than average, but not double the national average for such work.

Nino Posella
Executive Vice-President
Amtec Systems Corp.
Los Angeles

Apples and apples

When I read your article "Users laud Mac IICX but lament price tag" [CW, March 13], I had to protest the statement that "Mac technology still comes at a premium when compared with MS-DOS-based systems" and the comparison of the Mac's price with that of IBM Personal Computer AT compatibles.

There is no way to compare a Motorola, Inc. 68030 system running at 15.7 MHz and 1M byte of memory (not to mention things like Appletalk, as a user notes in your article, an extra in clones) with what $2,000 will buy in the Intel Corp. 80286 market. Comparing an Apple with discounted clones instead of IBM Personal System/2s is like comparing apples to oranges.

What John Sculley calls "mid-range" and what you reflexively associate midrange with are not the same, I think. Also, making the user interface the big difference between Macs and clones ignores the power of the 68030 and the advantages it has over the 80286. If you're going to compare Motorola to Intel, it's 68030 vs. 80386.

Also, there already is a multitasking version of the Mac OS available, although without preemptive multitasking. I don't think that there's anything "in-between" about this box — it appears as powerful as the Mac IIX, at a more reasonable price. I can be satisfied with three slots, since I don't have to tie up slots with LAN boards. One for the graphics card and one for SNA connectivity is plenty.

Bart Zantzinger
West Chester, Pa.

Both sides now

Regarding "Help Wanted: Heroes and visionaries preferred" [CW, March 20], it must be realized that the aggressive systems programmer or technical support person is roundly criticized for assuming any of the roles "Wizard," "Magician" or "Witch Doctor." These titles do not connote positive qualities for the astute systems person, who daily faces a changing environment, a generally uninformed and perhaps hostile applications staff and the task of lowering the cost of processing information.

In an era where "teamwork," "cooperation" and "employee motivation" are the big buzzwords in corporate America, it behooves us very little to stand up and be counted as Wizards when the general view nearly companywide is that this is the guy who does it all with "blue smoke and mirrors."

However, what Champy and Hammer suggest, in terms of real progress being made while reducing staff, could not be more accurate. Clearing the decks for a good systems programmer by reducing the training he must do and the explanations he must make to the people who have been selected as project managers and team leaders by business-oriented managers will certainly expedite major projects. At the same time, it fosters creativity by providing ample time to apply that "other" side of the brain to the system's design.

Paul Reiter
Senior Systems Consultant
Computer Task Group, Inc.
Kirkland, Wash.

No more nerds

Regarding the editorial "Fund education" [CW, March 20], do not blame the schools or the government for lack of students: Blame the industry. Companies treat new, inexperienced people like dirt: no experience, no job.

You can blame the schools and the government for students' lack of knowledge but until children perceive science and math as being "non-nerdy," no amount of money will change these scores.

Richard Shook
S&R Associates, Inc.
Winchester, Mass.

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*

If you would rather be right

JOHN BARNES

Every MIS manager sooner or later hires someone who looks great on paper and interviews well — a nice guy who seems to understand everything after just one explanation — only to find that six months or a year later, the person has never actually done anything.

He's a professional interviewee. You've paid all that salary for a big smile and a good attitude. When you get rid of him, he'll climb aboard someone else's organization and do the same thing.

Sadly, the problem starts early. In some college classes I've taught, students have showed up looking sharp and neat, leaning forward bright-eyed to catch what I was saying and nodding at all the right points — and then did virtually none of the assignments and no studying at all.

A lot of them seemed to be really startled when they got the F. After all, they had such a positive attitude. People have always told them that attitude is what counts. Persuade people in power that you have the right attitude, and they'll give you what you want — as if good things are dispensed like Happy Camper Awards.

I once heard someone complaining that she'd had six jobs in five years, "really felt good" about all of them — and had gotten canned every time. She couldn't understand it.

Perceived threat

If it were just a matter of wearing whatever the power color is supposed to be this week and smiling when they don't feel like it, then the good-attitude folks wouldn't do much harm. But there's at least one image-related thing these people do that is actively dangerous to their organizations, and it relates to decision making.

In trying to impress people with your attitude, it is often useful to demonstrate that you keep up with things. For people working in our fast-changing industry, this can be very difficult.

So you begin to acquire facts in isolation, using them almost like slogans. You may pick them up by skimming articles or reports, by scanning the bulleted lists for memorable one-liners or from conversations with employees in other departments. After all, if you know a lot of facts, most people will think you are pretty smart.

The problem with this behavior is that most truly useful knowledge actually consists of "structures" of information — theories, common sense, experience and viewpoints — rather than the isolated facts that can be looked up as needed. There used to be a saying that mechanical engineers went to college for four years to learn how to understand what they look up in Mark's Standard Handbook for Mechanical Engineers.

But as useful as they are, structures of information aren't much good for impressing people. They take a very long time to learn, and besides, how well you think is not nearly as obvious to other people as the facts you can spit out. Structures of information have more to do with doing your job; isolated facts have more to do with impressing people.

Unfortunately, in today's climate of looking good, impressing people can be more important.

Aside from creating the appearance that people know more than they actually do, an emphasis on isolated facts can actually lead to bad decisions. To the person swayed by image, isolated facts look like a good substitute for thoughtful decision making.

KEITH BENDIS

Pick one fact and you can always justify a decision, even a wrong one. After all, people acquire staggering debts because the monthly payments are low. People vote for the incumbent because they got a raise this year. People bet on horses or stocks based on some single number that they consider overwhelmingly important.

Defensive decisions

In too many corporate cultures, if you declare an isolated fact to be the bottom line, a decision based on it is immune to criticism.

The problem is that a decision based on an isolated fact has only a random chance of being right. On the other hand, structures of information develop and get better over time so that decisions based on them stand an increasingly better chance of being right.

Unlike those image-protecting isolated facts, most theories and most bodies of experience support more than one possible choice, so decisions based on them can always be questioned. Structures of information may help you figure out what you should do, but they do little for your image.

Thus, when people make choices based on isolated facts, they are valuing a defensible answer more than a correct one.

Would you rather buy from, work for or contract with a company that cares about getting it right or one that cares about avoiding blame?

The next time somebody comes up with the decisive fact that "resolves" an issue you know is complicated and difficult — especially if that someone is you — think about it.

Barnes is northwest area manager of ADG, a high-tech marketing company based in San Pedro, Calif. His second novel, *Sin of Origin*, is now out in paperback from Worldwide Library. He lives in Missoula, Mont.

New technology may not be there when we need it

HARVEY P. NEWQUIST III

When it comes to new technology, most people in the computer business have a hard time looking past where their next spreadsheet is coming from. Many have heard of object-oriented databases, artificial intelligence, massively parallel processing and visual simulation — but hearing is as close as they've gotten.

In the years to come, however, all of these technologies should play an important role in almost every type of computerized application imaginable.

Advanced technology generally originates from hard work and brain busting at universities and research labs across the country. Here, computer scientists toil day and night to perfect some algorithm or superconducting material that will someday see the light of day in a computer product.

It is not these individuals' jobs to implement technology but to develop it. Implementation happens over years, driven by users who gradually get used to working with better technology after about five to 10 years of pulling teeth.

Pushing forward

Meanwhile, computer scientists are moving forward toward new developments as their older ones are finally getting accepted in the commercial world.

Probably the best-known example of this phenomenon is the screen interface technology developed at Xerox in the mid-1970s as part of the ill-fated Star. This terminal didn't fly, so its screen interface was buried along with it. The technology remained dormant until Apple resurrected it for the Macintosh. Then Microsoft discovered it just in time for Apple to sue.

So, it often takes a while for advanced research to pay off. It may seem esoteric and not immediately applicable to any class of problems, but someday new technology will solve new classes of computer problems, just as expert systems are doing today.

There is, however, concern that the long-term pursuit of advanced technology is being sacrificed for shorter term gains and developments — just as corporate America is doing. Instead of pushing the technological envelope at every juncture, many researchers are opting to further embellish existing technologies, which traditionally has been the job of the user over time.

One of the most outspoken critics of this practice of looking to the short term instead of the long term is Gordon Bell, the scientist who was instrumental in getting DEC moving and Encore Computing Corp. off the ground. He currently is leading Silicon Valley start-up Ardent Computer Corp.

In Bell's opinion, most of the work being done by computer researchers now is intellectual "mop-up." The advanced systems work that's being performed has already been done, he claims, and it doesn't need to be overdone.

For instance, doesn't the industry already have enough books and studies on C and database construction? Surely we don't need any more from the research community.

Bell's concern is that the technologies that we will need in the next few years and decades are being ignored. We have already capitalized on much of the existing architectures and software systems; now we must move on to other technologies to keep pushing computer development ahead.

For instance, two areas of great promise — visual simulation and parallel processing — are very viable technologies that aren't getting the kind of attention they need to speed their progress. Bell says that instead of looking into the promise of these newer technologies, many researchers are sticking to safer ground, reshuffling computer technologies we have already developed and deployed. They are becoming risk- and challenge-averse.

Bell has a point. Continued fixation on networking problems, database solutions, benchmarks and a whole host of acronyms is not going to move the state of the art along any further.

INSTEAD OF looking into the promise of these newer technologies, many researchers are sticking to safer ground, reshuffling computer technologies we have already developed and deployed.

By the time those of us who deal with the everyday use of computers have gotten past our implementation problems, we are going to be ready for — and in need of — the new state of the art that researchers have, we hope, come up with.

Nowhere is this technological need more obvious than in the looming specter of complete information overload. While computer users work on more ways to slice and dice data files, we are all ill-prepared for the increasing

Continued on page 23

Newquist writes and consults on artificial intelligence and other advanced-technology topics from his office in Scottsdale, Ariz.

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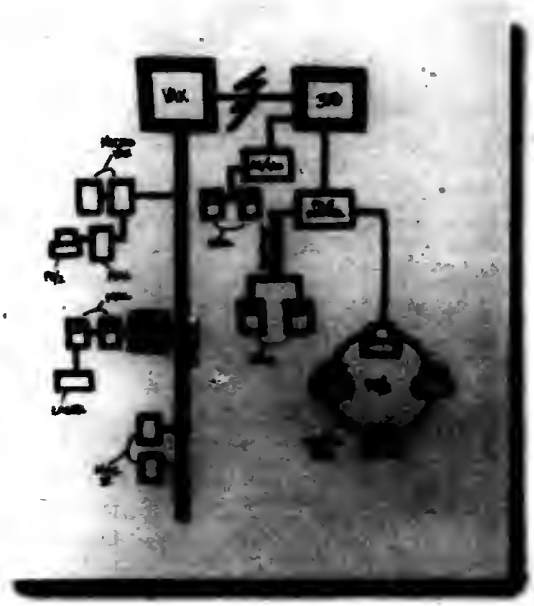

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Newquist

FROM PAGE 21

amounts of information that pile up day after day, week after week, year after year.

For instance, *The Wall Street Journal* reported last year that less than 50% of all the information received from satellites in the last 10 years has been processed. That's right, less than half of the last decade's worth of satellite transmissions has even been looked at. The point of the article was that information on the hole in the ozone layer — "discovered" a year ago — has actually been buried in databases that are 10 years old.

Day-old info

A large part of the problem is that we have not developed computer systems — primarily in the area of visual simulation — that can adequately handle such an incredible amount of digital signal transmission. Because of technology's current inability to deal with all this information, it is already out of date by the time we can interpret it.

So, imagine this scenario: Ten years from now, we have resolved many of the networking and interface problems that are currently front-page news every week in this industry. We're now prepared to move on to some really intelligent data handling and information filtering. As we look toward the research community from whence such offerings have flowed in the past, we see people shrugging their shoulders and sadly shaking their heads.

The researchers have been grappling with the same issues that computer users deal with every day. The researchers haven't had much time for researching new technology. The computer industry is faced with a case of "Sorry boys, no Christmas this year, unless you want to buy it from Japan or West Germany."

Idea shortage

With the primary wellspring of ideas drying up in favor of rehashing old technology, we'll be stuck with operating environments such as OS/2, created without regard for the necessary software applications.

There has to be a division between what computer science wants to pursue and what it wants to play with. Pursuing new technology is a risky business, but that is what ultimately provides us with a continued path of computer evolution as well as a competitive edge.

Playing with technologies that are already deployed is safe and sound. But safe and sound doesn't produce breakthroughs in machine learning, or new materials for microprocessors, or mainframes the size of a Cheerios box.

BOOKS IN BRIEF

Data Architecture: The Information Paradigm
By W. H. Inmon
Toward an information architecture — the evolution of a paradigm explained, along with advice for installing new systems.
Hardcover, 284 pages, $49.50, ISBN 0-89435-268-7, by QED Information Sciences, Inc., Wellesley, Mass.

Implementing Software Engineering Practices
By Fletcher Buckley
A software engineer at General Electric Co.'s Government Electronic Systems Division details the practical steps that can lead to successful software development in a commercial facility.
Hardcover, 172 pages, $34.95, ISBN 0471-63386-0, by John Wiley & Sons, Inc., New York.

CASE is Software Automation
By Carma McClure
An introduction to computer-aided software engineering (CASE) that explores user implementations, productivity claims and CASE's relationship to other software technologies.
Hardcover, 290 pages, $44, ISBN 0-13-119330-9, by Prentice Hall, Inc., Englewood Cliffs, N.J.

Publishers wishing to have their books considered for review can submit them to Glenn Rifkin, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

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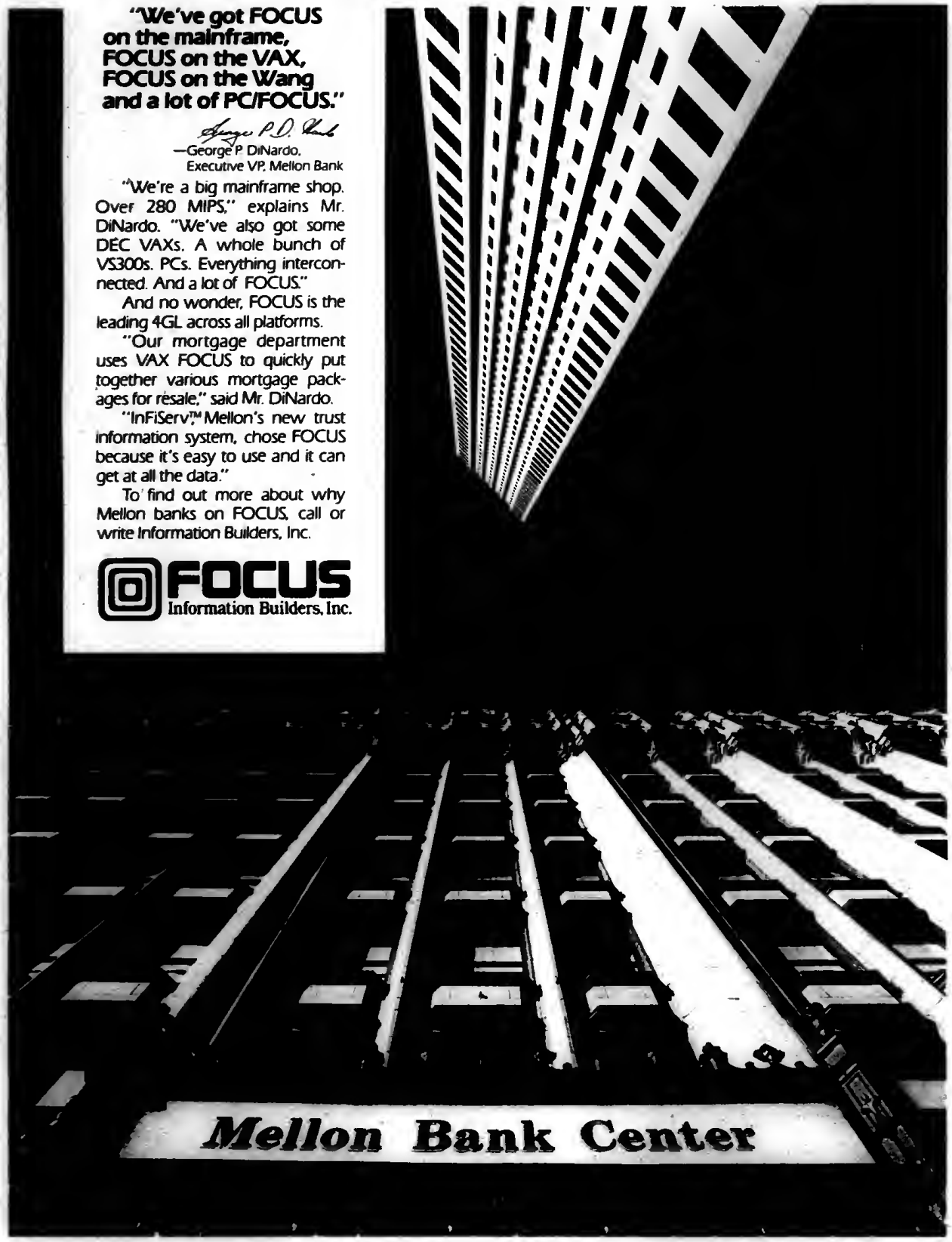

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HARD TALK

Rosemary Hamilton

IBM as the hired help?

Late last month, IBM made a slick marketing pitch on its customized service options that portrayed the company as a friend to customers who want to take care of troublesome data center projects.

According to the pitch, a customer need only hire IBM, and big projects like data center redesigns and relocations will be taken care of. Gone are the headaches and extra hours that would have been the MIS manager's constant companions had he handled the job himself.

Usually, there's a catch when something sounds so good. I couldn't help but wonder what else the MIS manager might be losing. Something about allowing IBM to do so much for a customer was unsettling. A situation could develop in which IBM designed the customer's data center, installed the IBM equipment, hooked up the cable to connect the equipment and managed the network.

Couldn't this situation develop to the point where the customer was relying too much on IBM and, as a result, was giving up some control of decisions

Continued on page 30

Benchmark gains following

BY STANLEY GIBSON
CW STAFF

While the computing community has been clamoring for a single, clearly defined Debit/Credit benchmark standard, it appears probable that TP1, a subset of Debit/Credit, will gain widespread acceptance as well.

According to Omri Serlin, chairman of the Transaction Processing Performance Council (TPC), database vendors favor the establishment of a second standard that tends to isolate the database function in processing transactions. The full Debit/Credit implementation, on the other hand, brings in variables such as terminal network configurations that blur the significance of the database software used, the database vendors believe.

The TPC has been meeting regularly to define the Debit/Credit standard but has not published specifications. Serlin said the TPC has not yet started dealing with TP1.

Despite the ill-defined state of TP1, several vendors, including Software AG of North America, Inc. and Informix Software, Inc., recently released results of TP1 tests. Software AG also released Debit/Credit results, claiming a world record of 167 Debit/Credit transaction/sec. Its TP1 maximum was 388 transaction/sec.

Unlike database management system vendors, Software AG favors Debit/Credit over TP1 because it sells a teleprocessing monitor that it claims can improve its results over those of competitors that do not offer teleprocessing monitors.

Informix strove to achieve low cost per transaction in a Unix environment, claiming costs of $8,900 to $10,900 per transaction/sec. over a five-year period, depending on the system. Informix conducted its tests with Sequent Computer Systems, Inc. processors. Earlier, Informix announced 126 transaction/sec. on a 16-processor Sequent Symmetry system.

Software AG calculated a transaction per second cost of approximately $38,600. Its tests were performed on a National Advanced Systems AS/EX 100, which offers power comparable to that of an IBM 3090 500S running IBM's MVS/XA.

In Software AG's Debit/Credit run, no controller was actually used, although one was simulated. Whether to require a controller is one of the points the TPC is debating.

The cost of configuring a mainframe with a communications controller deters many database vendors from undertaking full Debit/Credit implementations, said Peter Kastner, vice-president of the Boston-based Aberdeen Group, Inc., who observed the Software AG tests.

The Software AG test was audited by Coopers & Lybrand, which noted that the sustained transaction throughput was 12 minutes for on-line Debit/Credit and five minutes for the 388-transaction TP1. Preliminary TPC guidelines require sustained performance for 15 minutes.

Inside

Erasable optical disks step closer to forefront

ANALYSIS

BY JAMES DALY
CW STAFF

The other shoe could soon fall in optical technology's bid to become an essential storage tool for corporate America.

A few years back, the arrival of the write-once read-many (WORM) optical disk drive was hailed by MIS managers weary of crowding their shops with acres of large-scale direct-access storage devices (DASD). A single optical disk system could replace dozens of large-scale DASDs.

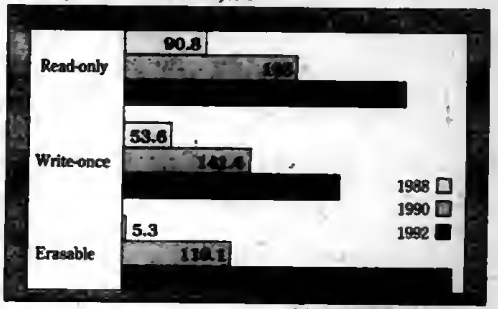
But there was a flaw. While not being able to erase what is stored on an expensive optical platter was fine for applications such as legal and medical archiving, it was limiting for others.

Enter the erasable disk. Erasable disks work by using a laser

Continued on page 34

Dueling drives

Erasable disk drives should leap to the fore as the optical storage arena expands in the next three years



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IBM custom service strikes gold

Customers willing to pay to have IBM handle time-consuming chores

BY ROSEMARY HAMILTON
CW STAFF

While IBM recently made a public splash with its simplified maintenance contract Serviceplan, it has quietly been making a killing with customized service options for more than a year.

Both Serviceplan and the customized options, which include data center design, relocation and cabling services, center on the service-made-easy concept. Though IBM has offered customized options on a per-request basis for years, customers have flocked to them since they became official offerings last year.

For instance, IBM claimed to have performed only 5,210 relocations in 1987, but it handled 21,250 last year.

Customers interviewed recently heaped praise on IBM's customized services and claimed that the most efficient way to handle these time-consuming tasks is to pass the responsibility to IBM.

"I'm going to get the people that are the best at the job and hire them to do it," said Roxanne Reynolds-Lair, MIS director at the Fashion Institute of Design and Merchandising in Los Angeles, where IBM is completing a data center design and cabling project. "As long as we're getting what we need from IBM, then it's worth what we're paying."

Reynolds-Lair said that having IBM handle the data center project, which includes design, construction and cabling, will cost more than if the school had handled it alone.

With the data center design service and other offerings, a customer contracts with IBM to handle a project and IBM assumes the role of project manager. IBM will hire the necessary contractors, including architects and electricians, and handle negotiations with them. It also will oversee the work as well as issue progress reports to the customer.

Frees time for other tasks

Reynolds-Lair and other customers interviewed said putting IBM in charge means they can devote their time to other ongoing data center concerns, such as application development projects.

It also means far fewer headaches because they deal with only one person — their IBM contact — rather than the full cast of characters from architects to plumbers that get involved in such projects.

"We could have coordinated this, but you can end up with lots of finger pointing and wasting a lot of time," Reynolds-Lair said. "By doing it this way, IBM made sure it was going to work."

IBM is not the first to come up with the idea of customized service options. Instead, it is going after a chunk of business that third-party maintenance suppliers and other computer companies have long pursued. The business is non-fix-it service, or any type of service offering other than traditional repair business. As hardware reliability improves, the need for repair services lessens. The services providers, therefore, have been forced to come up with new money-making options.

"Any vendors that continue to focus on fixing broken machines will be out of business in a few years," said Donald Goodspeed, vice-president of service and maintenance strategies at Meta Group, Inc., a consulting firm in Westport, Conn. "IBM is going after [customized service] with vigor. They want to sell, sell, sell."

For Leslie Green, an executive vice-president at Equibank in Pittsburgh, the decision to put IBM in charge of a data center redesign was actually an easy one. According to Green, IBM simply had more of a grasp of data center issues than his own staff or vendors that competed with IBM for the job.

"We found that a number could build the data center, but they didn't understand our business," Green said. "I'm not an IBM bigot, but I'm impressed with the number of resources and skill levels they can bring to a problem."

Northrop's mountain of paper now a molehill

BY JAMES DALY
CW STAFF

EL SEGUNDO, Calif. — Although Northrop Corp. built its reputation in the aerospace industry crafting earsplitting fighter jets, it may soon be renowned among magicians for a spectacular vanishing act.

Since last fall, Northrop has converted more than 16,000 pages of documentation relating to its assembly work on the F/A-18 Hornet fighter jet into a package of 36 four- by six-inch microfiche cards that is lighter and smaller than a loaf of bread.

Northrop spent four years and more than $10 million on the slim-down project, dubbed the Integrated Management Planning and Control for Assembly system.

In the past, clerks would deliver thick blue binders to assemblers detailing their shift's work. The files were updated daily, but it was laborious keeping up with unforeseen problems.

"The plans couldn't account for real-world situations, like people calling in sick or drill bits breaking," said Lauren Perreault, manager of manufacturing initiative programs and one of the architects on the project. "So at the end of each day, we had to reconcile actual practice against what our plans were, then replan the next day's work. It was a struggle."

Northrop workers spend their day building the F/A-18's center and rear fuselage, vertical stabilizers and the associated subsystems for the aircraft's prime contractor, McDonnell Douglas Corp. There are 104 assembly positions on the quarter-mile assembly line, with each section taking two days to go from one position to the next on its six-month journey down the line.

A delay at one assembly station can easily ripple down the line, thus requiring another rewrite of the daily work forecasts, Perreault said. So many reports have been produced, Northrop officials added, that the Hornet assembly operations have already produced paperwork that could reach four times higher than the Empire State Building.

Documentation is now computerized and available instantly, giving engineers, quality inspectors, supervisors and assembly workers the same information simultaneously. Northrop writes its own software, thereby ensuring a tight applications fit.

Ready for action: *An F/A-18 Hornet fighter jet*

Access to the system is simple. After workers arrive, they log on to the system at one of 137 Tandem Computers, Inc. terminals. The terminals are hooked up to six Tandem TXP

Continued on page 32


SC
HOST
MPUTER

Bruce Sobolov of CBS News, Laura Gismondi and Bruce Goldberg, AT&T, savor the afterglow of their own post-election victory. They take us behind the scenes for a glimpse at some of the reasons why CBS was successful on election night.

FEBRUARY 15, 1989

Skating between terminals put ruts in the rug.

AT&T: Afterwards, the critics said CBS was the best, the fastest.

CBS: Right, but we sweated it out for more than a year. With more 20-hour days than I care to remember.

AT&T: Your situation was pretty complicated.

CBS: We were faced with election projections, exit-poll analysis, and other studio programming applications running on IBM hosts.

AT&T: Plus the NewStar system we tied in with our wide-area network, ISN. It's distributed networked computing. Hey, we thrive on this stuff.

CBS: We're impatient around here. Speed is the only way you succeed with election coverage. The first thing we did was provide multi-host access with the 6500 System. Last election, everybody who needed access to two systems used two terminals. Twice the space, twice the cable, additional controllers, added expense, and wasted time.

We had programmers working simultaneously on three host applications, two bisync, one SDLC. They were constantly skating between terminals, wearing ruts in the rug. Now they have access to multiple sessions simultaneously from one terminal.

AT&T: The data moves over twisted pair, the same type wiring the technicians pulled for your System 75 PBX. That made sense.

CBS: An added advantage was having the same dedicated AT&T technicians installing and maintaining our system, providing consistency to my operation.

AT&T: But really, Bruce, why us?

CBS: Your responsiveness. At CBS, we all agreed that what we needed was someone who could deliver it fast, install it, test it, and support it. And you were hungry. You never said, "No, we can't do it." And you never took long to say "yes."

AT&T: You had computer networking problems. Solving them is the house specialty.

CBS: We do distributed computing to the nth degree. Our reporters are all over the country. They call in their results when the precinct closes. Before, we had over a hundred operators standing by, with phones and terminals. That election night we introduced the voice response system running on AT&T PCs.

AT&T: How many calls?

CBS: Thirty, thirty-two calls at once, reporters everywhere having voice response conversations with the IBM host. And all done with the same custom host software we always used. We greatly reduced our cost.

AT&T: The other networks are watching, thinking, "How come CBS has the results already and we don't?"

CBS: It was a good night for us. Now the name of the game is streamlining for 1990. We're talking about a networked computer solution as a gateway into different host systems.

AT&T: With the AT&T Systems already up, running, and in place, we can almost completely automate your survey system.

CBS: That's a real big plus for all of us.

AT&T: Something tells me I've seen that same glint in your eye before. (Laughter)

The CBS Solution:

THE CHALLENGE

Integrate IBM and DEC host computers and NewStar editorial system. Build an advanced computerized voice response system to speed election-night projections.

THE SOLUTION

AT&T 6500 Multifunction Communication System with multi-host sync/async 6529 terminals. AT&T CONVERSANT® Voice System for advanced communications running on AT&T WGS computers. AT&T System 75 PBX. AT&T Information Systems Network (ISN), a wide-area network.

THE RESULT:

CBS News provided fast, accurate election coverage throughout Campaign '88. The *Baltimore Sun* reported that, "CBS was recording results in all sorts of key races faster and with far more authority than either of the other networks."

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DHL sold on cosmopolitan Unix

Despite software headaches, operating system has global appeal for courier

ON SITE

BY J. A. SAVAGE
CW STAFF

REDWOOD CITY, Calif. — William Pigott sees the Unix operating system as a cornucopia just beginning to unfold. Yet after two years of applications development, DHL Airways, Inc. is still caught in the narrow end of that horn of plenty.

DHL may not have a name as big as Federal Express Corp. within the U.S., but Pigott, DHL's vice-president of information services, claimed that the firm handles nearly 50% of all international courier traffic.

Headquartered in Brussels, DHL has committed to Unix as an efficient way to maintain cross-border business. This commitment runs so deep that the company has acted as a reseller of Unix-based systems in the international market.

"Unix is the operating system of the future for someone who wants to work in a global sphere," Pigott said, noting that with Unix, DHL can run a common operating system on hundreds of systems of diverse scales that fit the varied sizes of DHL offices.

Applications such as customer service, operations control systems and communications systems now run under Unix. DHL would like to cut all the applications over to its 15 Pyramid Technology Corp. Series 9000 on-line transaction processor superminicomputers. However, some in-house-developed applications, such as accounts receivable, have been running on DHL's Unix-based Pyramid system in parallel with an Amdahl Corp. mainframe for more than a year. "We still can't cut over," Pigott said. "It has to do with satisfying the user. They keep adding [requirements], and we keep modifying the system." Another on-line system, from Stratus Computer, Inc., runs DHL real-time applications in Vienna, Va.

MARVIN COLLINS

DHL's Pigott *expects Unix to deliver*

Incorporating Unix applications where there had been only the mainframe and IBM's SSP and RPG II on 150 IBM System/36s has been a headache. But Pigott's troubles flared last August when the relational database management system from Unify Corp. that runs DHL's shipment information database in Vienna was "corrupted" by a power fluctuation.

"The major problems we've had have been in the transition from code that runs well in small applications to code that runs well in big applications," Pigott said. "We realized we didn't have the tools we needed and found out [Unify] couldn't fix it."

Pigott said the subsequent transfer from Unify to the Informix, Inc. RDBMS was "pretty quick. We just rewrote the hooks into the database. Now we're trying to get Unify out of the systems," he said.

He added, "I don't blame Unify. I blame the programmers who wrote it for the lack of standard development tools." Such tools would have smoothed conversion of DHL's IBM-based systems to Unix, Pigott said.

For its part, Unify said through a spokeswoman that DHL was using an old version of its RDBMS that did not have automatic recovery or 100% uptime. The firm's Unify 2000, released in November, has these features, she said.

Although Unix is an open operating system, Unix-based applications still must be crafted to the various types of machines such as the Pyramid 9000, according to Pigott. Because all versions of Unix are a bit different, Piggott noted, "porting [to different versions of Unix] is not as simple as people would like it to be."

The CCITT X.25 wide-area network interface posed such a problem. Pigott said he worked with Pyramid for 18 months on its implementation. "X.25 is a beast," he said. "The computers had difficulty talking to the board that talks to the network."

While the X.25 interface was certified for all the company's applications last year, DHL had trouble getting it to run on NCR Corp.'s Tower 600 family of Unix-based computers in its foreign offices.

Caught in the middle

Caught between the old proprietary systems and the new and rather troublesome Unix, Pigott has to adapt DHL's initial grand scheme to fit reality. "Originally, we had the idea that we'd put midrange Unix machines everywhere, but the cost drives you crazy," he said. "That's why mainframes are around. You can get economies of scale." That is why DHL's Pyramids are likely to be located in a few data centers in London, Houston, Vienna and San Mateo, Calif.

For Pigott, venturing into Unix gives a particularly sensitive role to support. He does not expect DHL's foreign offices to adopt Pyramid hardware, which requires more on-site support than Pyramid can offer worldwide. Outside of the U.S., NCR Towers, Groupe Bull and IBM are likely to be attractive to DHL groups that have been attracted to the individual companies in their local country, Pigott said.

In California, at least, Mountain View-based Pyramid is "just down the street" from DHL's San Mateo offices. "That's one of the things that caused me to build here. [DHL's system] is a heart-stopper system," Pigott said. He figures that the Pyramid and Informix ambulances will arrive before his heart stops.

SOFT NOTES

Storage Technology plans to bundle Oracle RDBMS

Storage Technology Corp. and **Oracle Corp.** recently announced a cooperative software venture. Storage Technology, as a value-added relicenser, purchased the right to embed the Oracle relational database management system in its future software products. Oracle will be a fundamental component of Storage Technology software for management of storage hierarchies in both IBM and non-IBM environments.

Marc Software International, Inc. in Palo Alto, Calif., recently signed a joint marketing agreement with **Unisys Corp.** covering Marc's Wordmarc word processing software on the Unisys 5000/85 and 5000/95 Unix-based minicomputers. Under the agreement, Marc and Unisys salespeople will make joint sales calls. In addition, Wordmarc will be demonstrated at Unisys Solution Centers.

Blueline Software, Inc. in Minneapolis said it acquired Vlock software from its developer, Thomas Ericsson. Vlock is designed to provide virtual lockfile for IBM DOS/VSE users sharing direct access storage devices under IBM's VM operating system. Vlock has 200 users.

Bull H. N. Information Systems, Inc. of Toronto and **Zanthe Information, Inc.** in Ottawa announced that ZIM, a fourth-generation development environment from Zanthe, will be marketed by the Bull sales force. ZIM is available on all Bull XPS Unix Series models at prices starting at $3,660.

Piedmont Systems, Inc. in Middleton, Mass., said that it acquired all rights to White Hat Systems, Inc.'s White Hat MRP II software, which runs on Digital Equipment Corp. VAX systems. Piedmont renamed the product PSI-MRP II. Piedmont also acquired a suite of financial applications from White Hat, which it renamed P.S.I. Financials Applications Software. Piedmont announced a 35% price cut on service and support for the financial applications through May 10.

D. Appleton Co. said Release 2.1 of its IDEF/Leverage process and data modeling software will support database design for **Cincom Systems, Inc.**'s recently released SQL-based Supra Version 2. IDEF/Leverage will automatically generate the SQL database definition statements directly from its data models, according to the vendor.

Alliant Computer Systems Corp. in Littleton, Mass., said it awarded $10,000 to the University of Texas M. D. Anderson Cancer Center in Houston for the development of parallel algorithms for use in computer-aided cancer research. Researchers are developing an algorithm to search massive databases to identify and match up similar sequences of DNA or protein.

Symbolics, Inc. and **Intellicorp, Inc.** entered a joint development agreement under which Intellicorp's knowledge-based system development environment will be provided on Symbolics workstations. The companies will offer a version of Knowledge Engineering Environment for Symbolics' MacIvory and XL400 workstations.

Hamilton

FROM PAGE 25

made in his shop?

Of course, IBM dismissed that notion. But more importantly, so did the customers I spoke with.

Sure, they said, if a user is willing to hand over responsibility to IBM and walk away, then they are putting themselves at risk. But these customized service customers said contracting with IBM for multiple data center projects does not give IBM more power in their shops. They look at IBM as simply hired help and nothing more.

New ditty

We in the industry once talked about IBM's clout with customers and how it could lock them into its 370 architecture and have them at its mercy. It seems some customers are now singing a different tune.

Take Equibank in Pittsburgh. IBM is handling its data center design project, but Executive Vice-President Lesley Green said it is his stamp of approval that goes on the final plans.

Green meets with the IBM project managers regularly and signs off on proposals. He said he never looked at contracting with IBM as a way of handing over his problems. They still belong to him. But IBM is working to see they are resolved.

Checking in

Roxanne Reynolds-Lair, MIS director at the Fashion Institute of Design and Merchandising in Los Angeles, said she has weekly meetings with her IBM representative on the data center design project under way at her firm. She comes with a list of questions, and then IBM gets the answers and gets back to her.

Reynolds-Lair said she never worried about giving IBM too much control in her shop. She had planned to have IBM involved in this project from the beginning — even before she knew they offered the data center design service — because she wanted their expertise. She views hiring them as project managers as no more than officially tapping into that expertise.

Chances are, then, there may be more than a speck of truth to IBM's slick marketing pitch — as long as other customers share the attitude that IBM can serve as hired help.

Hamilton is *Computerworld*'s senior editor, systems.

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User requests prompt Covia to upgrade Travelmaster

BY ELLIS BOOKER
CW STAFF

Citing user requests for enhancements, Covia recently upgraded its Travelmaster product for managing corporate travel and entertainment budgets.

According to product marketing manager Dave Near, the Travelmaster User Group was instrumental in developing Version 4.1. "About 60% to 70% of our development effort stems from their suggestions," he said. He added that the product is unique for Covia because it is sold directly to corporate users of travel services rather than providers of these services such as travel agents.

"They hit all our top-priority items," confirmed Leona Campos, president of the 100-member user group and a group leader in the corporate financial systems department at American Cyanamid in Clifton, N.J.

Covia began marketing Travelmaster last year after acquiring the assets of ICS Corp. in Salem, N.H., which developed the Cobol-based accounting subsystem.

In addition to a seven-person dedicated sales staff, Travelmaster is sold by the sales staffs of two of Covia's partners, United Airlines and USAir.

Travelmaster has been implemented on IBM OS/CICS, DOS/CICS and IMS platforms as well as minicomputer and personal computer systems. Depending on configuration, the product sells for $10,000 to $18,000 for the PC version and $30,000 to $80,000 for a mainframe implementation, Near said.

Version 4.1 adds an improved report generator, additional security and control features and a new module for government users.

Syncsort claims edge with ESA version of utility

BY AMY CORTESE
CW STAFF

The sorting race is on. Just last month IBM announced a faster version of its sort utility that takes advantage of some Enterprise System Architecture (ESA) features. Then, Syncsort, Inc. one-upped the industry giant with the introduction of a new version of its Syncsort utility that takes greater advantage of ESA.

Syncsort claims that ita sort utility is the first utility of any kind to take full advantage of IBM's ESA. The new ESA version of Syncsort — due this month — uses both the hiperspace and data space features of ESA to achieve faster performance. IBM's Data Facility Sort Release 11, on the other hand, uses ESA's hiperspace feature but not data space.

Hiperspace makes use of expanded storage to speed up data access time drastically. Data space, which extends the memory capacity of IBM's MVS/XA, is more akin to real memory.

Syncsort claims that with data space, 64 times more memory can be accessed, allowing the use of new sorting algorithms.

IBM said its new release of DF Sort will perform a sort in three quarters of the time the current release requires. Syncsort claimed that with the boost from data spaces, performance will be 40% better for comparable tasks.

However, for the more constant measure of CPU cycles and elapsed time, performance can be improved by up to 80%. A three-year license for Syncsort is $9,600.

Northrop

CONTINUED FROM PAGE 27

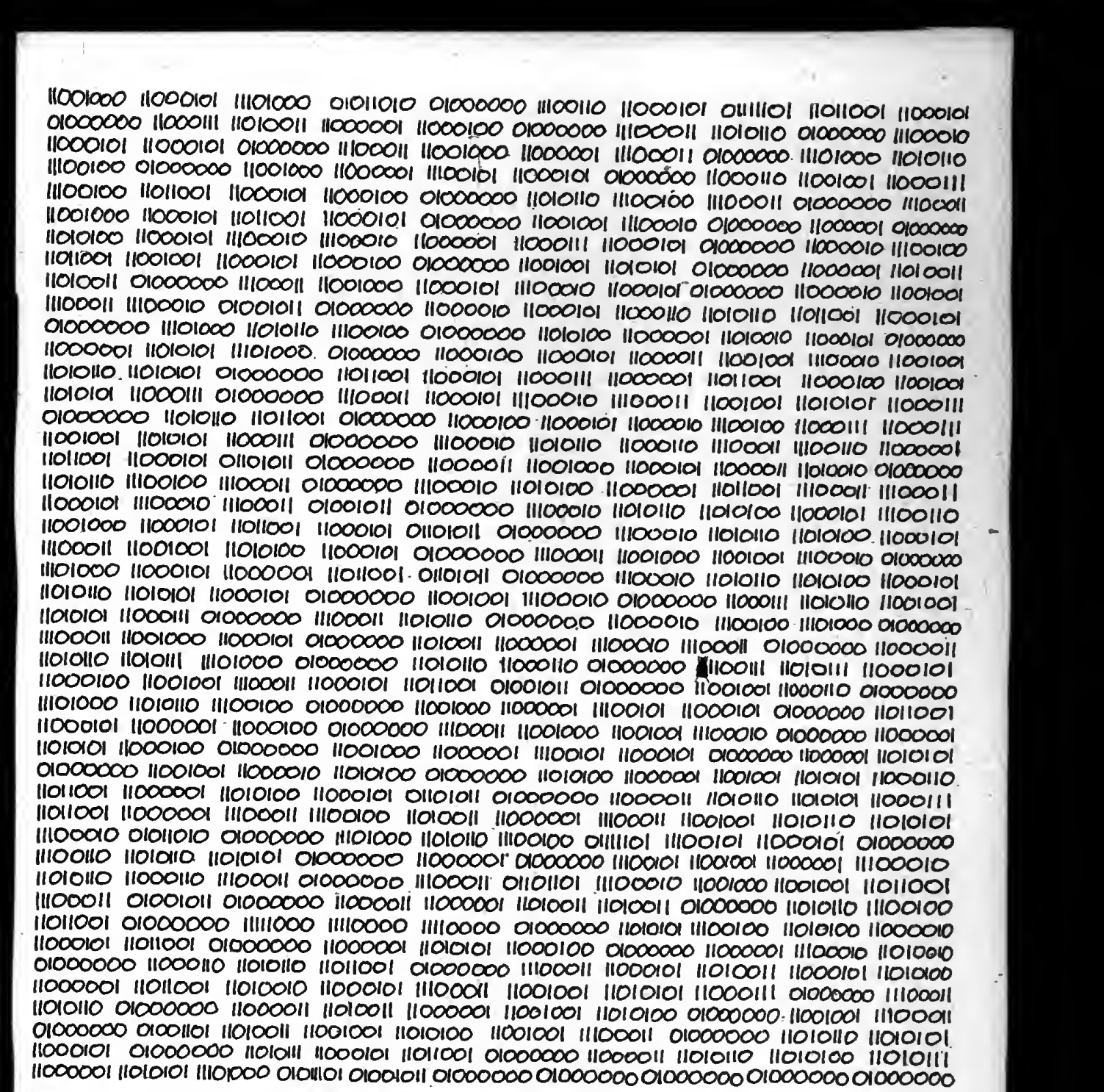
processors and provide a screen display of the work the employee is expected to handle that day. Once the work is completed, it is duly noted, providing supervisors with real-time progress reports.

Changing work orders once took about two hours but now can be done in 30 seconds. Workers used to spend more than 200 hours a week updating and distributing work plans; these are now performed automatically by the system.

Ironically, workers were skeptical of the system. "They were afraid they might not be good at it and lose their jobs," Perreault said. "But we gave them our assurance that we intended to fully train and support them. Nobody was fired."

In addition to the time savings, cost reductions have been equally dramatic. Although the project took more than four years and $10 million to complete, it is expected to save $21 million, or nearly $17,000 per aircraft, over the remaining life of the project.

These savings will be passed on to Northrop's principal customer, the U.S. Navy. Northrop is more than halfway through its contract to deliver 1,442 Hornet jets to the Navy and U.S. Marine Corps. The jets are also used by the air forces of Australia, Canada and Spain.



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Optical disks

FROM PAGE 25

beam to erase the data bits that have been magnetically recorded on the disk. The new media "can be erased and written on more than one million times," claimed Sony Corp. Chairman Masaaki Morita.

Although erasable drives reached the commercial sector only last year, a latent demand promises to ensure that the market will flower quickly. Market research firm Freeman Associates, Inc. in Santa Barbara, Calif., estimated that more than 364,000 erasable optical drives will ship in 1992, up from 5,300 last year. Within three years, shipments of erasable drives will exceed those of WORM drives.

The arrival of new technologies is also expected to fuel demand. Of the three technologies developed for erasable optical disk drives — magneto-optic, phase-change and dye polymer — only magneto-optic has been commercially available so far.

Tough competition

Consequently, vendor competition in the potentially lucrative area should become intense. Sony, Sharp Electronics Corp., Canon U.S.A., Inc. and Hitachi Ltd., among others, all have 5¼-in. magneto-optic erasable drives, and a dozen suppliers could be clamoring for users' dollars by the end of this year, said Robert Abraham, vice-president at Freeman Associates.

Meanwhile, Japan's Matsushita Electric Industrial Co. recently introduced the first 3½-in. erasable drive. The drive — based on phase-change technology developed by Troy, Mich.-based Energy Conversion Devices, Inc. — uses a thin film that coats the disk and serves as the recording medium. The film can be heated to alter its structure between a highly reflective crystalline state and a less reflective amorphous state.

Varying the laser's power causes atoms in the film to switch between the two states; at low power, the beam can read out data on the disk. A direct overwrite system erases old data as new data is written.

The good news for users is that prices should tumble 50% or more by 1993 as competition heats up, Abrahamm said.

Like any virgin industry, a lack of standards has hampered the development of the disks. But that issue, too, is being addressed. Hewlett-Packard Co., Advanced Micro Devices, Inc., Mitsubishi Electronics and several other companies recently announced support for a recording format for erasable 5¼-in. optical disk cartridges.

Although their support for the Continuous Composite Servo format for optical disk cartridges has not been approved by a standards body, it is an ambitious early attempt to forge a standard in a market where few official standards exist.

Despite the many advantages of erasable disks — fast random access and the ability to sponge away data that is no longer needed — problems remain.

Erasable optical disks are not exactly speed demons, because magneto-optic read-write heads are heavy. For example, an average DASD transfer rate to a mainframe is 3M byte/sec., but the transfer rate for the optical disk systems will be around 1M byte/sec., said Scott McCready, associate director of market research firm CAP International, Inc.

Access time on erasable disks is also "pitiful" when compared with a Winchester drive, Abraham said. "We're seeing several bundred gigabyte Winchester drives that run in the 13- to 16-msec range, but we may never see that performance from erasable media," he said. "However, it ought to crash through the 30-msec barrier and hit 25 msec."

Despite the rough spots, the promise of erasable optical disks has some users licking their chops. A Gartner Group, Inc. forecast that erasable optical disks were coming down the road in a year or two changed the purchasing plans of Walter Perkowski, vice-president of computer operations at Republic National Bank of New York, who said he is prepared to put off buying hard disks for "another six months or so" to see if the optical devices meet Gartner's predictions.

NEW PRODUCTS — SOFTWARE

Development tools

Viasoft, Inc. has announced its second product and a platform reported to be the foundation for an integrated suite of intelligent Cobol re-engineering products, called Via/Center.

According to the company, Via/Center products are based on a re-engineering platform that extracts information about how programs work. The platform stores the information online for programmer use during the re-engineering cycle.

VIA/Smarttest, an interactive tester and debugger that includes program analysis capabilities, was also announced.

VIA/Center products operate in an IBM ISPF environment and are priced from $39,500, depending on system configuration.

Viasoft
3033 N. 44th St.
Phoenix, Ariz. 85018
602-952-0050

Saber Software, Inc. has introduced an enhanced version of Saber-C, its C language development environment that reportedly allows software engineers to prototype, test and debug C programs twice as fast as the previous version.

Release 2.1 is for use under X.11 Windows or Sun Microsystems, Inc. Windows and runs on both Sun workstations and Digital Equipment Corp. VAX computers. The software package is priced at $2,500.

Saber Software
30 JFK St.
Cambridge, Mass. 02138
617-876-7636

Applications packages

Sterling Software's Dylakor Division has announced an enhanced version of Dyl-Audit, its fourth-generation language auditing and financial system.

The software runs on an IBM MVS, VSE or VM environment and can be equipped with a full-screen menu-driven editor to assist with the development of programs under TSO, CICS or CMS, the vendor said.

Version 4.9 reportedly has been optimized for letter processing, a feature that checks for unspecified blanks and eliminates them, thus enabling the printer to generate the fewest possible lines.

Dyl-Audit Version 4.9 is priced from $15,155 to $27,000.

Sterling Software
Dylakor Division
9340 Owensmouth Ave.
Chatworth, Calif. 91313
818-718-8877

GMD, Inc., an IBM Business Partner, has announced a software enhancement for the IBM Manufacturing Accounting and Production Information Control System environment.

The Material Availability System reportedly provides a common source for all corporate planning functions and allows status questions on orders, purchase requisitions and manufacturing resource planning requirements via a single menu option, the vendor said. The software package runs on IBM midrange systems and is priced at $4,000.

GMD
[illegible]1 Dunwoody Place
Atlanta, Ga. 30350
404-587-0934

Medicomp of Virginia, Inc. has introduced an electronic medical records and clinical information system for the health care industry.

The Medicomp system reportedly creates a complete health-care information system with separate modules for record keeping, diagnostics, pharmacy and laboratory data.

The package runs on a wide range of computers, including the IBM Series 1 and Intel Corp. 80286- and 80386-based computers under DOS or AT&T's Unix System V, the company said. Modules range from $600 to $150,000.

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MICRO BITS

Douglas Barney

Chips ahoy!

Fuel to the fire. With upgrades that take years to build and never seem to match the hype, the micro software business can be dull and frustrating. Despite endless squawking about the personal computer revolution, PC hardware is like American autos: Both improve only marginally from year to year and are generally too slow and ugly.

Workstation makers are a whole different breed. These folks constantly try to out-Ferrari each other. The machines are never fast or good-looking enough. Yet unlike megadollar cars that most people can't even afford to fix, workstations are becoming cheaper.

We should all take our hats (or toupees) off to the workstation engine developers that are pumping out amazing new chips. With RISC this and floating-point that, these guys could really teach the staid PCers a lesson. Give it a few more years, and maybe I'll even buy one.

The workstation market was not always so hopping. Just thinking about the slow, expensive machines for engineers built a few years ago would put an in-

Continued on page 47

Processors to steal limelight at Comdex

But offerings are based on not-yet-available chips and need new software

BY WILLIAM BRANDEL
CW STAFF

CHICAGO — Comdex shows of the past have traditionally been dominated by such big-name vendors as IBM, Compaq Computer Corp. and Microsoft Corp., making arguments for glitzy new system lines, buses and operating systems.

But this spring's Comdex is in Chicago this week, in the country's heartland, where hard work is a fact of life. So it is only fitting that the announcements at the show are dominated by the promise of personal computer machinery that performs most of the system's hard work: the processor.

Ironically for users, though, they will have to wait months for the new processor and software that will allow them to reap the benefits the new and existing 80386 processors from Intel Corp. have to offer.

Comdex/Spring '89 will be the launching pad for numerous systems based on Intel's 80386SX and the new 33-MHz 80386, which will be the stars here this week. Intel will also unveil the widely anticipated 80486, or "the mainframe on a chip," which can reportedly attain 10 million instructions per second (MIPS) at peak performance. But little in the way of software applications is expected to follow in the new microprocessor's wake.

The 33-MHz 386, the 386SX and the 486 are all built around the 386 architecture. A Microsoft source acknowledged that the processors are indeed faster than the 25-MHz 386 but cannot be fully exploited until OS/2 for 386 systems and applications that run on it are released. In fact, the aging 80286 is just hitting its stride.

So the hardware systems may draw "oohs" and "aahs" from the spectators while simultaneously driving vendors to make grandiose performance claims about their new systems. But there remains very little a user can do with the 33-MHz processor, except maybe run a software application faster. Little software is available to exploit the chip's 32-bit capability.

Contrary to speculation, 33-MHz 386 chips will not be ready to ship in volume when they are announced, said John Dunkle, vice-president of Work Group Technologies in Hampton, N.H.

For this reason, the smaller clone vendors will be the first to announce their systems with a

Continued on page 48

Inside

Product rumblings

Intel hopes its speedy 33-MHz 80386 microprocessor will steal the thunder at Comdex this week

	Intel 80386 clock speed	
	25 MHz	33 MHz
Dynamic RAM speed	100 nsec	80 nsec
Static RAM speed	30 nsec	20 nsec
Bus clock speed	8 MHz	8/10 MHz
RAM bus clock speed	25 MHz	33 MHz
Wait states	0	0

SOURCE MYLEX CORP
CW CHART JOHN YORK

Metaphor brings info down to earth

ANALYSIS

BY MICHAEL ALEXANDER
CW STAFF

Executives in large corporations often require carloads of information at their fingertips but cannot easily retrieve the data from general-purpose databases without an assist from MIS.

One solution, according to a growing number of large corporations and government agencies, is a system of workstations developed by Metaphor Computer Systems, Inc., located in Mountain View, Calif.

The company's workstations were designed specifically to enable nontechnical managers and executives to extract information from databases and construct their own applications.

The typical system consists of Metaphor workstations, database servers, file servers, host communication servers and laser printers connected by local-area networks. Metaphor's interactive software includes integrated information retrieval, spreadsheet, graphics and text-processing tools that are accessed using a mouse. Display screens graphically depict mail trays, folders, file drawers and other common business tools that contain the information users must access.

The main tool is the Query tool, which delivers a visual depiction of the relational database to the user. This tool allows the user to construct queries against specified tables or predefined views of the database. Users issue queries by clicking on icons, selecting categories and specifying sequences of operations by

Continued on page 48

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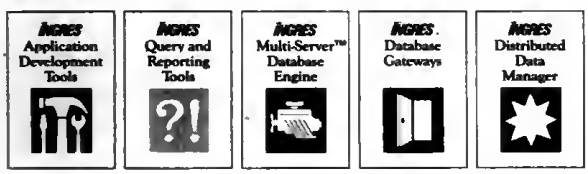

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REVIEWS/NEW PRODUCTS

Xerox spiffs up desk presentations

Xerox Corp.'s Xerox Presents is the first true desktop presentation product for MS-DOS. It creates visuals, speaker's notes and handouts. The package's import features create impressive slides and transparencies, and its Video Presentation feature lets you use your computer as a presentation device for manual or automatic slide shows.

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Xerox Presents' interface shows a movable tool palette on the left, a drawing space in the center and a set of pull-down menus along the top. You can start a presentation from scratch or load one or more page styles.

A ruler with justification and tab icons appears whenever you use the word processing tool to create or select a text block. Within any text block, you can vary the font, size, style and color of any group of characters. Margins, indents and leading can also be adjusted.

The object-oriented drawing tools surpass those found in some drawing packages. In addition to basic drawing tools, there are arcs, diamonds, parallelograms, polygons and a freehand tool. Use of the Shift key allows you to draw squares, circles and horizontal and vertical lines. The drawing tools offer 16 fill patterns, five line widths, five line styles, nine arrow types and 12 styles of rectangles.

The graphing tool creates a wide assortment of business graphs, including ones with a three-dimensional look. Graphs can be moved or resized and can also become part of a group of objects and saved as a page style so that you can incorporate it into other presentations.

Xerox Presents supports Lotus Development Corp.'s Freelance .CGM or .GMF file formats, the .PCX format used by Z-Soft Corp.'s Publisher's Paintbrush, .MSP files from Microsoft Corp. Windows' Paint, encapsulated Adobe Systems, Inc. Postscript and .TIFF files.

Xerox Presents comes with a complete reference guide. Error messages and troubleshooting are covered extensively. A training guide contains self-paced tutorial exercises, and on-line Help is provided.

Xerox Presents is available on either nine 5¼-in. high-density floppies or 16 3½-in. low-density floppies. Installation is the biggest headache, with the process lasting more than an hour.

Use your computer *as a presentation device for slide shows*

Learning Xerox Presents is a bit like learning an integrated package. It is easier if you are familiar with Windows or the Apple Computer, Inc. Macintosh environment.

The Windows environment greatly adds to this product's ease of use. Xerox Presents' only serious drawbacks are the lack of a spelling checker and an integrated outliner.

The difficulty in installation is worsened by the fact that you can correct errors only by repeating the entire installation process. Trying to import a large text file also hung up the system, although no data was lost.

Registered users receive free but not toll-free technical support for 60 days, the Xerox Presents newsletter and advance notice of new products. Extended support plans are available, ranging from $50 to $1,000 per year. Four minutes was the average holding time before reaching a support representative.

Xerox Presents enables you to produce presentations with a professional look. Although it compares favorably with Version 1.0 of Cricket Presents for the Macintosh as well as with other Macintosh products from Microsoft, it cannot yet match Aldus Persuasion 1.0.

Still, it only costs $495, runs under Windows 2.1 and comes with a runtime version of Microsoft Windows as well as the Bitstream Fontware Installation Kit, which features 10 fonts in a variety of sizes and styles.

Autodesk explores new dimension

Enhanced Autocad surface-modeling program features 3-D capability

Autocad 10 is the first edition of Autodesk, Inc.'s computer-aided design (CAD) software to include full-function, three-dimensional wire-frame and surface modeling. Autocad's sibling, Autoshade, has also been updated to do shaded rendering.

Autocad 10's most significant new features make this a complete and powerful 3-D surface-modeling program.

Viewports, which are like windows in a word processor or spreadsheet, permit you to view your model or draw from up to four different perspectives at once. The User Coordinate System (UCS) allows you to work on different planes of the same wire-frame drawing or solid model. The Plan command allows you to view a UCS in plan view.

Autocad 10's modeling capability allows you to make negative impressions in an existing shape and create true surfaces. You can view constructions in

A 3-D *surface-modeling program*

true perspective and see more than one side of a model at a time. You can lock one or more axes when placing vertex points.

In addition to Bezier curves, you can draw cubic or quadratic B-splines. Placing dimension text and arrows is more flexible in this version.

The tools menu now features XYZ axes filters that keep you from inadvertently misplacing a vertex along the Z axis. A new CHPROP command and the dialogue boxes in the pull-down menus make it easier to change an object's properties, such as color, layer and line type.

Autocad 10 extends its placement tools to work consistently with 3-D and make it easier to properly place entities in space.

Version 1.1 of Autoshade is compatible with files created by Autocad 10. Autoshade now comes with Autoflix, a program that animates renderings, wire-frame models

Continued on page 40

Softlogic's fast spreadsheet compiler for users of 1-2-3

Softlogic Solutions, Inc.'s Liberty spreadsheet "compiler" turns Lotus Development Corp. 1-2-3-compatible spreadsheet template files into templates that do not need 1-2-3 to run. It also protects templates against overwriting or alteration and ensures that the user cannot view formulas or sensitive data.

To convert spreadsheet template files with Liberty, you simply select the file you want compiled, and Liberty does the rest. You can customize the converted spreadsheet display and predefine spreadsheet defaults for users. The result is a semicompiled file that you distribute along with an included runtime module.

Liberty supports math coprocessors, and the runtime module runs on computers with as little as 256K bytes of random-access memory and no hard disk. The product handles files from any program that generates .WKS, .WK1 and Symphony files. It supports the full range of Lotus Functions and macro commands.

We tested performance in several cases with three files. As a real-world test, we used a sanitized version of a 135K-byte template that contained an ordinary mix of data and formulas. Macros were tested separately. As a stress test, we tried a 239K-byte single-column file consisting of one data cell (A2) and 8,191 formula cells, thus filling the spreadsheet with the maximum number of rows possible. We also tried loading files generated by spreadsheets that can produce 1-2-3-compatible files and a public-domain tax worksheet with a circular reference error.

Spreadsheets convert very quickly with Liberty. Once one is compiled, the templates load with blinding speed, and saving times are very close to those of 1-2-3.

Softlogic Solutions' Liberty Version 2.01

Price: $295

- Performance: Very good
- Documentation: Excellent
- Ease of learning: Very good
- Ease of use: Very good
- Error handling: Very good
- Support: Good
- Value: Very good

One of Liberty's handy features is a macrocode generator that reads keystrokes and prompts users with a menu of braced macro commands. When you select a command, the macrocode generator prompts you for any necessary arguments and then writes the code for you, using the correct syntax.

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Autodesk

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and two-dimensional drawings. It uses flip-card animation to show a series of drawings at up to six frames per second.

We tested Autocad 10 on a 10-MHz Everex Systems, Inc. IBM Personal Computer AT compatible with an STB Systems, Inc. Video Graphics Array Extra display card and a Nanao U.S.A. Corp. 16-in. 9070S Multiscan monitor.

The drawing tools provided by Autocad are powerful and versatile enough to have served as a performance benchmark for other CAD programs. All drawing entities can now be used to construct a 3-D model, and all editing commands now work on 3-D models.

The Autolisp macro programming language lets you customize everything — including keyboard, menus and digitizing pads.

With Autocad 10, users are able to directly transfer files between all Autocad platforms, files of older versions are upwardly compatible, and the product supports the industry's longest list of peripheral devices.

The new tutorial is the best yet from Autodesk. It takes you from the basics of drafting through the basics of 3-D modeling. A lucid glossary of computer graphics terms is included.

Autocad 10 is an intricate, complex program. It takes users months to become proficient in all of its subtleties.

Although the complete modeling capabilities are difficult to learn, they do not interfere with the process of basic drawing.

The vendor provides complete installation instructions, but it expects your dealer to install the program for you.

Like most users, you may be accustomed to drawing on a flat plane. However, the seamless integration of full-function 3-D surface modeling, the addition of needed 3-D placement aids such as Viewports, the UCS feature and axis filters and the extension of object snaps to include all 3-D equivalents all add to Autocad 10's ease of use.

Autocad 10 carries over all of the previous version's error-trapping capabilities. You can still undo and restore any number of actions, and there are even more self-explanatory screen messages when you make an error.

24-hour response time

The dealer network remains the vendor's preferred source of end-user support; a response in 24 hours is guaranteed. Users with urgent concerns can call Autodesk's toll-free number for a referral to another nearby dealer. Vendor support is a last resort. Autodesk mails all registered users a monthly magazine.

On each call we made to the nearest dealer, the CAD support technician was out, but be always called back with informative and helpful advice.

Autocad 10 lets you move from design concept through engineering plans to the renderings needed for marketing and client communications. Autoshade ($500 or $400 when purchased with Autocad) now comes with Autoflix and extends your capability to show a design in motion. At $3,000, Autocad 10 costs only $5 more than Version 9, and it provides true 3-D capabilities.

Autocad Release 10

Price: $3,000

- Performance: Very good to excellent
- Documentation: Very good
- Ease of learning: Very good
- Ease of use: Very good
- Error handling: Excellent
- Support: Good
- Value: Excellent

THE NEW tutorial is the best yet from Autodesk. It takes you from the basics of drafting through the basics of 3-D modeling. A lucid glossary of computer graphics terms is included.

Softlogic

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Compiled spreadsheets have the look and feel of the Lotus original, including any window and title setup. Liberty supports stacked bar, grouped bar and X-Y plot graphs. If you want to display graphs, you must define and name them before compiling your spreadsheet.

Liberty's manual is well-written and has a generous supply of diagrams, flow charts and illustrations to support the text.

Although the tutorial takes a bit of time to complete, it is well worth it. It includes a sample worksheet that walks you through the process of preparing some moderately sophisticated macros to work in a compiled spreadsheet.

Run's subset of Lotus commands is straightforward and understandable. Its context-sensitive on-line Help should answer most user questions on use of the runtime module. You can provide your own Help macros in the template.

Macros are one area in which Liberty could be simpler, as it takes some time to figure out how to rewrite elaborate code.

No errors were encountered in compiling files that loaded and ran on Lotus. In a test of how it handled problem files, two faulty worksheets were compiled. One was truly faulty, a "glitched" file that even Lotus could not load. Prepare handled it competently, providing appropriate error messages.

The other error was a worksheet created in a foreign file format and was not designed to be recognized by Liberty. Prepare had more trouble with this one. About 80% of the way through, it froze, locking up the computer and requiring a reboot.

Softlogic warrants the product to work as described in the documentation. Both 5¼- and 3½-in. disks are included. There is no limit to the number of copies you can make of the runtime program. Technical support is available by phone or via a bulletin board. Softlogic technicians answered calls for support immediately. The technicians were knowledgeable and eager to help.

If you use Liberty to replace just one copy of Lotus, you have recovered more than the entire cost of the program. At $295, this package is well worth the investment.

NEW PRODUCTS

Software applications packages

Superior Software, Inc. has introduced CFM, an expanded-memory version of its CF: Cash Flow Analysis program.

CFM removes the DOS 640K-byte memory restriction and provides users with more detail in constructing cash-flow projection from within the DOS environment. The menu-driven software also includes a three-part tutorial.

It requires an IBM Personal Computer AT or compatible system with an Intel Corp. 80286 or 80386 chip and 1M byte of random-access memory. A single-user program is $795, and site-license pricing is available.

Superior Software
Suite 725
16055 Ventura Blvd.
Encino, Calif. 91436
818-990-1135

Beckman Associates Ltd. has announced a word processing application for users of Microsoft Corp.'s Windows/286 and 386, Versions 2.03 and later.

Called Myriad, the product can import or export text and graphics through the clipboard function, the vendor said. Features reportedly include lines, ellipses, rectangles and shading capabilities, and the program also provides style sheets, document merge and table and index generation.

The package is priced at $249.95, and 1M byte of free hard-disk space is recommended.

Beckman Associates
Suite A
928 Oakcrest St.
Iowa City, Iowa 52246
319-354-5116

Macintosh products

Generic Software, Inc. has released an upgraded version of Generic CADD Level 1 for Apple Computer, Inc.'s Macintosh computer.

Version 1.1 reportedly includes a Macintosh-to-MS-DOS transfer utility, multiline text placement and backwards-redraw capabilities.

Two additional fonts have been incorporated for engineering and architectural applications, according to the vendor. The computer-aided design and drafting package costs $149.95.

Generic Software
11911 N. Creek Parkway S.
Bothell, Wash. 98011
206-487-2233

A two-dimensional graphics software package for computer-aided design applications is now available from Diehl Graphsoft, Inc.

Called Blueprint, the product runs on Apple Computer, Inc. Macintosh computers and reportedly offers multiple layers, object-by-object color and precise zoom capabilities.

Additional features include a hierarchical symbol library and a built-in DXF translator, the company said. The package is priced at $449.

Diehl Graphsoft
Suite 202
8370 Court Ave.
Ellicott City, Md. 21043
301-461-9488

Jasmine Technologies, Inc. has introduced a line of external hard drives for Apple Computer, Inc. Macintosh computers.

The Directdrive series is available in 20M-, 40M-, 80M-, 100M-, 140M- and 300M-byte configurations, the vendor said.

All units will be be shipped with a proprietary system management software that reportedly provides Small Computer Systems Interface (SCSI) partitioning and full support for the A/UX operating system.

Pricing for the Directdrive series ranges from $549 for a 20M-byte configuration to $2,795 for the 300M-byte version.

All units include a full two-year warranty, according to the company.

Jasmine Technologies
1740 Army St.
San Francisco, Calif. 94124
415-282-1111

Peripherals

A laser printer for engineers involved in computer-aided design and manufacturing applications has been introduced by Brother International Corp.

Called the HL-8E, the 8 page/min printer reportedly features Hewlett-Packard Co. Graphics Language emulation.

It can be used as a desktop companion to offload plotter usage and alleviate backlogs, the vendor said. HL-8E is priced at $2,895.

Brother International
8 Corporate Place
Piscataway, N.J. 08855
201-981-0300

A handheld remote-control device designed for use with IBM Personal Computers and compatibles has been announced by Forte Communications, Inc.

According to the company, the Remote Keyboard controls a PC's display much the same way a remote unit controls a television set. A user can reportedly manipulate a PC's program from distances of up to 50 feet. The unit is said to be ideal for classroom and presentation use and is priced at $395.

Forte's *Remote Keyboard*

Forte Communications
680 W. Maude Ave.
Sunnyvale, Calif. 94086
408-733-5100

GTCO Corp. has introduced the Digi-Pad Super L Series large graphic digitizers. The devices were designed to supersede the company's L Series product line and have been reconfigured with several additional features, the vendor said.

Enhancements reportedly include a built-in setup menu that allows users to select key operating parameters via a cursor or stylus. An active area outline is permanently marked on the tablet surface to aid in positioning drawings and application menus. The products are available in five different tablet sizes ranging from 17 in. by 24 in. to 42 in. by 60 in. and are priced from $2,000.

GTCO
7125 Riverwood Drive
Columbia, Md. 21046
301-381-6688

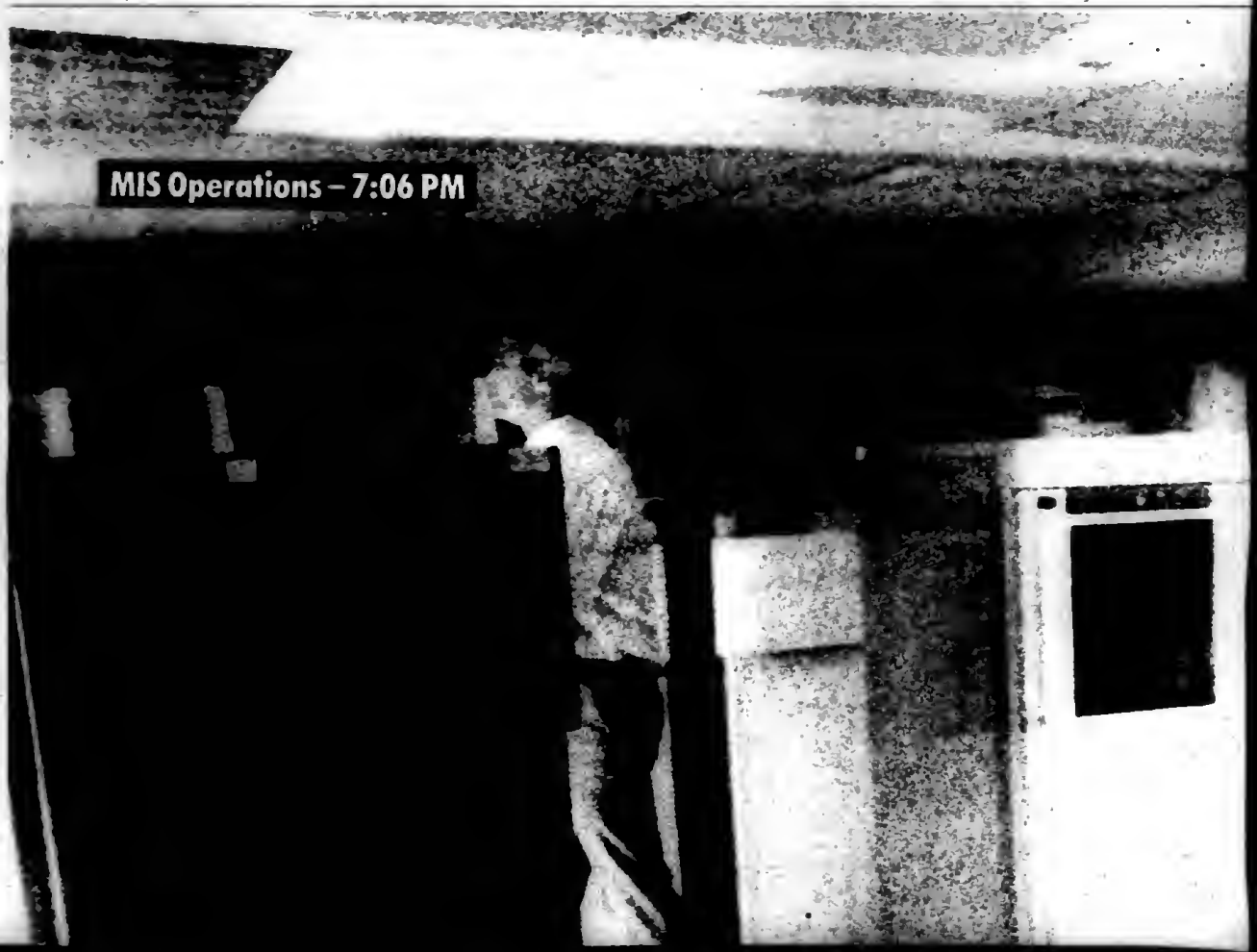
Development tools

Optima, Inc. has annouced Designvision ELS, an entry-level version of its Designvision computer-aided software engineering tool.

According to the company, the product runs on any personal computer-based workstation with 640K bytes of memory and Microsoft Corp.'s Windows 2.0 or later. The package reportedly uses predefined models for 10 common diagraming methods such as Warnier/Orr, Yourdon and Chen Entity-Relationship. Each model can be customized for individual computing environments.

Designvision ELS costs $995 per single copy.

Optima
Suite 400
1300 Woodfield Road
Schaumburg, Ill. 60173
800-633-6303



MMC AD Systems has released updated versions of the C Programmer's Toolbox Volumes I and II for IBM Personal Computers and compatibles. The Toolbox is a set of 21 tools reportedly designed to enhance programmer productivity.

According to the vendor, Volume I Rev. 1.3 and Volume II Rev. 1.1 now include support for the new draft ANSI standard, simplified code generation capabilities and a number of bug fixes. A hard disk is highly recommended.

Volumes I and II retail for $79.95 each, or $140 for both, according to the company.

MMC AD Systems
Box 360845
Milpitas, Calif. 95035

Polytron Corp. has announced a developer's toolkit version of the company's Polyswk programming language.

Called Polyawk Toolkit, the product reportedly includes a translator that allows developers to create and distribute stand-alone, executable programs.

The programs created with the translator do not require Polyawk to run, nor is a runtime license required, according to the vendor. The product requires OS/2 or MS-DOS 2.0 or greater for operation, the company said.

Scheduled to ship this month, the package is priced at $295.

Polytron
1700 N.W. 167th Place
Beaverton, Ore. 97006
800-547-4000

Systems

A portable data acquisition system that offers 16 channels of analog and 8 bits of digital I/O has been announced by Elexor Associates, Inc.

The TD-4000 incorporates a Toshiba America, Inc. 1000 Plus portable computer, an internal data acquistion module and a set of software tools, according to the vendor. The system was reportedly designed to perform logging, measurement and analysis functions in a field environment.

Elexor's ***data acquisition system***

TD-4000 is priced at less than $2,000.

Elexor Associates
P.O. Box 246
Morris Plains, N.J. 07950
201-299-1615

Tektronix, Inc. has announced X Window System Version 11, Release 3.0, for all Tektronix 4310 series graphics workstations.

According to the company, the standard will reportedly be available with the release of Tektronix' Utek 4.0 operating system, due in the first quarter. It was designed to provide users with improved graphics and windowing capabilities.

The X Window System is a communication standard and user interface that allows Tek Workstation users to access X Window System client applications running on a variety of host computer platforms, the vendor said.

The Tektronix 4319 color graphics workstation is priced at $11,950.

Tektronix
P.O. Box 1000
Wilsonville, Ore. 97070
503-685-2838

A single-user workstation for capturing compact disk/read-only memory (CD-ROM) or CD-Audio data onto a compact disk has been introduced by Optical Media International.

The Topix Spectrum System is reported to be a multiformat CD workstation with an integrated CD recorder. Users can assemble, format and record CDs in-house at a cost of less than $100 per disk. The Intel Corp. 80286-based desktop system is priced at approximately $150,000, depending on the user's applications and option requirements.

Optical Media International
485 Alberto Way
Los Gatos, Calif. 95032
408-395-4332

Data storage

A rack-mount expansion chassis that supports up to four 5¼-in. removable Winchester drives has been announced by Sigma Information Systems.

Designated the SA-H188, the chassis contains a front console with write-protect and ready switches for each drive. It also includes a controller I/O panel, the vendor said. The product costs $1,270, and quantity discounts are available.

Sigma
3401 E. LaPalma Ave.
Anaheim, Calif. 92806
714-630-5417

A product designed to extend the life of half-height hard disks used in personal computers is now available from American Technology Labs.

According to the vendor, PC Disksaver is a fan the size of a half-height disk unit that mounts below a half-height disk in an IBM Personal Computer, XT, AT or clone system. The device reportedly cools the disk temperature by as much as 30 degrees and is priced at $39.95.

American Technology Labs
115 W. 3rd St.
Stevensville, Mont. 59870
800-223-9758

Rural county reaps high-tech bounty

Utah agencies on the cutting edge in micros

ON SITE

BY DOUGLAS BARNEY
CW STAFF

VERNAL, Utah — Watch enough television and you will begin to believe that rural areas are backward in the arts, sciences and technology. But just try telling that to Dave Thomas.

Thomas, an MIS manager, is 165 miles away from Salt Lake City in the thinly populated county of Uintah, Utah. However, to help manage the seat of county government here, Thomas has acquired a veritable who's who and what's what of hot micro-oriented technology. In the process, he has put to rest the tired and false image of the country bumpkin who is years behind big-city technical hotshots.

The county now has four 25-MHz Proteus Technology Corp. multiuser microcomputers hooked to gigantic 360M- and 740M-byte Maxtor Corp. hard disk drives running Oracle Corp.'s Oracle database management system. These leading-edge systems are replacing the aging 3B minicomputers from AT&T. "They were too slow," Thomas said of the 3Bs.

Faster boards due

To keep the Proteus systems immune from the same criticism, Thomas will upgrade them with snazzy 33-MHz Intel Corp. 80386 boards as soon as the boards are available.

Beyond speed, the Proteus micros offer other benefits. "We decided it was cheaper to go that way — maintenancewise and everything else," Thomas said.

Does this sound like enough leading-edge micro technology? How about tying in Sun River Corp. fiber-optic workstations for county draftsmen? That would be plenty for most technology freaks, but Thomas is not stopping there. He is also planning to widen the use of Borland International's Paradox, but he will not run this database manager under MS-DOS as most of his contemporaries have. Instead, he will use VP/IX, an operating system from Phoenix Technologies Ltd. that allows MS-DOS to run as a task under Unix.

Thomas and his partner Anita Nokes do not buy technology because it looks good on paper. They buy it because it is cost-effective and works. So far, so good, Thomas reported.

With some 22,000 residents, the county has made steady inroads toward downsizing, having moved from a former Burroughs Corp. host to AT&T 3B minicomputers and finally to the Proteus micro-based systems that act as hosts.

Thomas did not learn all his stuff in Uintah County. He also spent a year at the Air Force Weapons Labs in Albuquerque, N.M., and benchmarked everything from Sun Microsystems, Inc. workstations to Harris Corp. minicomputers.

That is where he discovered the beauty of the 80386. "After we did all the benchmarks, I pretty much decided that the best way to go was a 386 because of the cost/performance," Thomas said. Now, there is no turning back.

The 80386-based Proteus backbone supports the county courthouse, treasurer, assessor, auditor and health department. The sheriff's department and the prison complex are handled with the help of an AT&T 3B15 minicomputer and AT&T terminals.

Most of the software has been developed using Oracle, a product chosen years ago for its portability. Whereas it originally ran on the AT&T 3B2, it is now focused on running under The Santa Cruz Operation's Xenix on the Proteus systems. The auditor, treasurer, land management office, MIS, sheriff, jail and health department all use custom Oracle applications.

Later this year, when Paradox gains the SQL interface promised by Borland, it will also be tied directly to Oracle, Thomas said.

Watch out for the incredible shrinking laptop

BY JULIE PITTA
CW STAFF

Riddle: What's smaller than a bread box — much smaller — and can access electronic mail on the road?

Answer: The new class of personal computers.

PCs are getting smaller. No surprise; that has been the trend for the last couple of years. What is likely to astonish some computer users is just how small PCs will get in the not-so-distant future.

Several vendors are promising MS-DOS-based laptops that fit in the pocket of a suit jacket before year's end. Robert Gerwer, marketing vice-president of Poqet (pronounced, you guessed it, "pocket") Computer Corp., said his company's laptop will measure 8½ by 4 in. and will weigh approximately one pound. The screen area will be 25 lines long and 80 characters wide. However, questions remain about whether serious computer users will tolerate the inherent limitations of such tiny computers.

The price for a Poqet computer will be about $2,000, a little more than the price of the average IBM Personal Computer AT compatible.

Poqet is offering few details — such as storage capacities — about the product. But, before you put this laptop on your list of potential vaporware, note that Poqet's founders hail from Texas Instruments, Inc., the same company that brought you inexpensive pocket calculators.

Briefcase-size

NEC Home Electronics, Inc. began shipping a briefcase-size laptop last December. "It's a little fatter than a magazine," NEC Vice-President Tom Martin said. The Ultralight, which also runs MS-DOS applications, measures 8½ by 11 in. and weighs about four pounds. Its screen is a backlit LCD with a resolution of 640 by 200 pixels. It uses silicon hard-disk storage. The price of the Ultralight is $2,999 with a 2,400 bit/sec. modem.

Meanwhile, Atari Corp. plans to announce its Portfolio pocket computer at Comdex/Spring '89 this week. The 7.8- by 4.1-in. product is based on an Intel Corp. 8088 microprocessor and MS-DOS. It offers an 8-line by 40-character LCD display and weighs 1 pound. It costs about $400.

Both Poqet and NEC are aiming at business executives on the go. "We're dealing with the unfulfilled promise of the laptop," Gerwer said. "The typical executive didn't go for the [earlier] laptop because of its size, weight and battery life. We're attempting to resolve those issues."

NEC's Martin said the company has been pleasantly surprised by the Ultralight's broad appeal.

"We saw the executive segment and saw its potential as an extension to the desktop," Martin said. "There have been these little pockets of interest that we didn't anticipate. One that wasn't obvious when we were introducing the product is that it appeals to women. Women aren't happy with 15-pound boxes."

Skeptical users

Corporate computer users are still leery about these new laptops.

"There's a conflict between a decent screen and a laptop that could fit in a pocket," said Phil Gordon, manager of office automation at Charles Schwab & Co. in San Francisco. "The kind of people we have here want to see a spreadsheet on the screen. Reducing the screen size is going to cause some problems."

"I doubt you would do anything long and protracted with it," said David Newman, a vice-president at Citibank NA in New York, noting that it would be useful for accessing electronic mail on the road or for pressing tasks. "There would be limitations with the keyboard and the screen."

User group stumps for 486 high-density disk standard

BY WILLIAM BRANDEL
CW STAFF

A corporate personal computer user group has one message for 3½-in. drive and high-density disk manufacturers: standardize.

As systems based on the Intel Corp. 80486 microprocessor wait in the wings, the 486 Standardization Committee hopes to influence floppy disk manufacturers to standardize their high-density products before they reach dealers' shelves. The group, a subset of the powerful Microcomputer Managers Association, consists of corporate microcomputer managers from firms such as Bear Stearns & Co. and Dow Chemical Co.

At present, manufacturers of 3½-in. storage disks are planning to launch very high-density disks in the 10M- to 21M-byte storage range, said Brian Livingston, the 486 group's chairman. However, the disks under development and the read/write heads they will operate with are not compatible, the 486 group charged. This has raised the ire of the committee's corporate micro managers.

Livingston said at least three major floppy disk manufacturers plan to release very high-density 3½-in. disks of varying media storage sizes. These manufacturers include Insite Peripherals in Santa Clara, Calif., Brier Technology in San Jose, Calif., and Panasonic Industrial Co. in Milpitas, Calif., he said.

> "WE CAN DO nothing about the present 3½-in. diskettes. But when you can see something like this coming over the horizon, we can make it compatible for MIS ahead of time."
>
> BRIAN LIVINGSTON
> 486 STANDARDIZATION
> COMMITTEE

Livingston noted that 486 systems — which will be used as minicomputers, high-resolution technical workstations and local-area network servers and will support memory- and processor-intensive operating systems such as OS/2 and Unix — usually require more data storage than their PC counterparts. So before the incompatible 3½-in. floppies and drives force users into the hard disk drive corner, the 486 group is making its stand.

"Our committee members are frustrated already about the incompatibilities," Livingston said. "We can do nothing about the present 720K-byte and 1.44M-byte 3½-in. diskettes. But when you can see something like this coming over the horizon, we can make it compatible for MIS ahead of time."

The high-density disk products are expected to fill the needs of workstation users previously dependent on the comparatively expensive 20M-byte hard disks. "Instead of having three or four manufacturers competing to beat out a standard and inhibiting the market, our micro managers would like to see them write to the same standard and compete on a price/performance basis," Livingston said.

Livingston and the committee's goal is to pressure the manufacturers to standardize before their products reach the market. But manufacturers are already aware of the potential nonstandard problem, according to Jerry Korth, president of Memcon Corp., an Omaha-based 3½-in. disk certification concern. Korth said that disk manufacturers have to borrow rigid disk technology to steal some of the latter's market.

The hub, a mechanical device in the disk that spins the media within the cartridge, must be designed with the servo technique used to pack large amounts of data on a rigid disk, Korth said. This will give the disks the balance that is crucial for continued performance.

"There is little doubt in my mind that these 10M- to 20M-byte diskettes will impact the low end of the hard disk market," Korth said. But he said he believes standardization will result from IBM's inclusion of a high-density disk in its low-end systems: "With floppy diskettes, the access speed is slower. But for users, it is a welcome trade-off to the power consumed, the price and space taken up by the rigid disks."

Competitive drive

The standardization of very high-density 3-1/2-in. floppy drives and disks will:

- Assure different manufacturers' heads are compatible with different 3-1/2-in. disks
- Standardize disks and drive heads for reading and writing data
- Cut disk costs through competition by driving licensing efforts

CW CHART: JOHN YORK

Fox plans Netware SQL client

Custom version of Netware SQL currently in the works

BY DOUGLAS BARNEY
CW STAFF

AUSTIN, Texas — Get out your scorecard: Yet another firm has entered the client/server vaporware sweepstakes. Fox Software, Inc., known for its speedy Dbase compiler and its well-publicized copyright dispute with Ashton-Tate Corp., will develop a client front end for Novell, Inc.'s Netware SQL server.

Fox will also market a custom version of Netware SQL dubbed Foxserver. The Dbase-compatible client, called Fox, and Foxserver will ship in the first quarter of 1990, well after an array of competitive products is expected to be available.

Much of the design work for the client and Foxserver has been completed, but no coding has begun, officials from both firms conceded. However, in a dramatic departure from the strategies of larger firms that believe more programmers are better, Fox President David Fulton argues that his small, tightly focused development team will get the job done on time.

Foxpro, an unshipped upgrade to Foxbase, will act as a menu-driven front-end product. Foxpro will ship this summer, with an update for Foxserver expected early next year. It will request data from Foxserver in several ways. For existing applications not reworked for SQL, Foxserver will store data in Dbase files. For those interested in optimizing for the server, Dbase commands can be replaced with their SQL counterparts.

According to Fulton, the front-end product will not require Dbase commands to be translated in SQL, even when dealing with the server in SQL mode. Instead, a so-called intelligent compiler will determine whether the request is in Dbase or SQL.

No price has been set for Foxserver or Foxpro.

Barney

CONTINUED FROM PAGE 37

somniac to sleep. For too long, the workstation chip makers were ultraconservative. Early workstations were fueled by the competent but aging Motorola 68000, which drove machines from the sluggish Apple Macintosh to now outmoded Sun Microsystems workstations.

Ain't so anymore. The workstation market has honest-to-goodness pizzazz, instead of the hollow kind that accompanies a faster PC or a new set of fonts for a word processor.

The PC chipsters, such as Motorola and Intel, plan to compete with themselves by shipping aggressively priced and powered reduced instruction set computing (RISC) chips. These make more conventional chips like the 68000 and Intel 80286 and 80386s look like slugs.

For its part, Motorola has the 88000 series, and Intel recently announced the supercomputer-like 1860. These chips will do battle with an array of RISC and non-RISC architectures, including Sun's Scalable Processor Architecture, IBM's RISC chip that powers its RT and chips from flashy upstart Mips Computer.

The well-publicized Intel 1860 demonstrates what the future holds. It contains one million transistors, has a 64-bit data bus (most PCs are either 8 or 16 bit) and, at 50 MHz, it could reach a peak execution rate of 100 million floating-point operations per second. That's cooking!

THE PCers, with their MS-DOS and OS/2, are really doing poorly when compared with the RISC-takers.

The one common element that anchors all these processors and keeps the market from imploding because of the violence of confusion is Unix. This portable operating system will run on just about any mainstream processor.

The PCers, with their MS-DOS and OS/2, are really doing poorly when compared with the RISC-takers. Intel has fanned the PC price/performance flames with its 386, a chip that keeps getting faster. The firm will begin shipping quantities of its 33-MHz chip, which vendors are anxious to build around. Later this year, the even speedier 80486 is expected to make its debut and spawn a whole new cycle of hardware primarily running MS-DOS, OS/2 and even Unix.

Motorola is up to the 68030, which offers high-speed operation and built-in multitasking, with the 68040 just around the corner.

These chips aren't shabby, but the constraints of compatibility limit creativity. With Unix able to port to most anything that can be loaded with a few megabytes of random-access memory, workstation chipsters have great freedom. Maybe what the PC folks need are a few more firms like Phoenix Technologies and Chips & Technologies to work out compatibility kinks, so they too can take a walk on the wild side.

Barney is a *Computerworld* senior editor, PCs & workstations.

Comdex

CONTINUED FROM PAGE 37

smaller clientele to please, while larger IBM and Compaq will not announce systems for weeks until Intel is shipping in volume. So, in addition to a vapor software lag, users have a two-month waiting period for volume processor shipments, he said.

Until then, the following vendors are announcing products based on the 33-MHz 386 at Comdex:

• AST Research, Inc. will introduce a desktop machine based on the 33-MHz 386. Dubbed the 386/33, it reportedly has seven peripheral board expansion slots.

The AST system also supports an Intel 80387 numeric coprocessor chip. The standard configuration includes a 5¼-in. 1.2M-byte floppy disk drive and three external drive bays. The product is available in three configurations that range in price from $6,595 to $11,595.

• Mylex Corp. will announce its IBM Personal Computer AT-compatible 386 33-MHz system and 386SX add-in hardware products. The MX386 33-MHz system board reportedly provides zero-wait state performance of 7.5 MIPS, which the company claims will make a PC run 53 times faster than the original XT. The MX386 is also available in a 25-MHz version, which the company rated at 5.7 MIPS. The products carry a list price of $2,400 for the 25-MHz version and $2,900 for the 33-MHz board when sold in OEM quantities.

• Companies that are planning to announce systems but did not provide information prior to the show include the following: Acer Technologies Corp. located in San Jose, Calif.; Advanced Logic Research, Inc. in Irvine, Calif.; and DTK Computer Corp. in City of Industry, Calif.

COMDEX/SPRING '89 will be the launching pad for numerous systems based on Intel's 80386SX and the new 33-MHz 80386, which will be the stars here this week. Intel will also unleash the widely anticipated 80486, or "the mainframe on a chip."

Metaphor

CONTINUED FROM PAGE 37

connecting icons.

Another tool creates capsules by opening a window and copying all of the icons needed for a procedure into it.

Business and financial analysts at Bankamerica Corp. in San Francisco use Metaphor systems for financial analysis and reporting, credit risk and banking products reporting, said Stoddard Vandersteel, director of MIS at the world banking division.

"Metaphor was appealing to us because it combines all of the functions that the analysts need into a single, integrated product that could be bought off the shelf and turned on," he said. The capsule tool is at the top of the list of valuable tools because it allows analysts to develop their own programs for automating recurring work, Vandersteel added: "One of their monthly reports is 60 pages long, and now, analysts have greater control over their work.

"Metaphor makes sense for any company, not from an individual's point of view but from a work group standpoint," he said. "We didn't go into [the situation] with work group computing in mind, but that has been the result. Once we started using it, it turned out that we started seeing other ways to apply the technology."

The software's tools work well together but are individually not competitive with their respective counterparts in the spreadsheet and word processing worlds, he said.

IBM alliance

In a move to boost its software's capabilities, Metaphor signed a pact with IBM to jointly develop software that can be used with IBM's Personal System/2 running OS/2 Extended Edition and relational databases on the IBM 9370 and MVS-based systems.

The company claims to have 110 customers with 175 installations. Nearly half are packaged-goods companies such as Colgate-Palmolive Co., Helene Curtis, Inc. and American Home Products.

Metaphor is particularly appealing to marketing executives because they typically work with large volumes of data, and Metaphor helps them gain access in a relatively easy way, said Joyce Young, manager of decision-support systems at Helene Curtis in Chicago.

From the MIS point of view, systems that enable end users to write their own applications or retrieve data exactly the way they want it has benefits, Young said. "It's the old backlog story," she said. "Metaphor does help reduce the backlog because users are in control of their environment."

However, the system is not without drawbacks for MIS. "It requires a technical staff to implement and support the networks and to maintain them," Young said. "We made the mistake of not understanding that early on."

DATA STREAM

Patricia Keefe

Time waits for no one

Banyan Systems presents an interesting study of a company trying to survive its teena, never mind food for thought for those tempted to use the firm's Vines network software to glue together a menagerie of network equipment into an enterprisewide system.

Along with a small but strongly loyal cadre of users, analysts tend to speak highly of Banyan's Unix-based network technology. Banyan, we're told, may not always be the first to offer a particular capability, but it is the most likely to fully integrate that capability into its system software. And that's something users can appreciate.

Notes John Good, president of the Association of Banyan Users International (ABUI), "Vaporware is all well and good, but tell me what you're going to do in the real world."

As one gleeful user at a large insurance company points out, when something happens to his network, all he has to do is call Banyan. There is no finger-pointing because, unlike 3Com and Novell, Banyan tends not to solve its problems with a lot of third-party add-ons.

In short, Banyan's mill grinds slowly but surely. Thus far, a focus on selling the ties that bind has created a solid niche market and provided a

Continued on page 58

Networks shine on *Sun* systems

Newspaper launches innovative effort to connect departments via LAN

ON SITE

BY MITCH BETTS
CW STAFF

BALTIMORE — At most newspapers, the news, advertising and production departments seem to have a Chinese wall keeping them and their computer systems apart. But *The Baltimore Sun* has launched an ambitious plan to connect those departmental systems with local- and wide-area networks.

The Sun plans to install a broadband LAN, running at a speedy 100M bit/sec., to handle color graphics for both news and advertising. At the same time, the Sun's integrated publishing system will comply with industry standards to avoid dependence on any one vendor, a common situation resulting from specialized publishing systems.

"We're now at the point where we are ready to replace various stand-alone systems, so we're taking this opportunity to implement our philosophy of integrated systems," said James P. McCrystal, director of information systems.

"Many newspapers look upon color graphics, for example, as an adjunct function in a separate studio system. But it should be an integrated function so you can see color where it's needed at any workstation on the newsroom floor," McCrystal explained.

To accomplish this, the newspaper recently signed a contract with Crosfield Electronics, Inc., a publishing systems vendor based in Glen Rock, N.J., for a $13.5 million integrated publishing system. The system includes Crosfield's editorial and advertising workstations for page design, which are Digital Equipment Corp. Vaxstations that use Crosfield software.

The project, due for comple-

Continued on page 52

Users lean to TCP/IP for net managing, study says

BY ELISABETH HORWITT
CW STAFF

SANTA CLARA, Calif. — Corporate information systems and networking managers are turning to existing Transmission Control Protocol/Internet Protocol (TCP/IP)-based products for their multivendor network management needs, rather than waiting for the Open Systems Interconnect protocols to mature, according to a recent study by Infonetics, Inc.

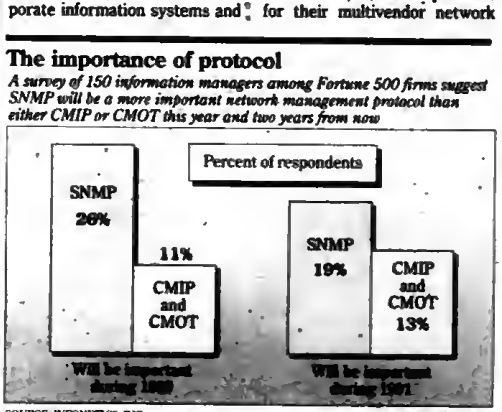
The Santa Clara-based research firm interviewed 150 IS and systems managers, 70% to 80% of whom played a major role in networking decisions at Fortune 500 companies. The survey avoided government and academic organizations, which are traditional TCP/IP users, according to Infonetics.

More than a quarter of respondents said that they see TCP/IP's Simple Network Management Protocol (SNMP) as important for their companies, despite the fact that only 23% of the respondents had TCP/IP networks installed, Infonetics said. In contrast, only 11% of the respondents attached any importance to OSI's Common Management Information Protocol (CMIP) or CMIP Over TCP/IP (CMOT), which was designed to provide a way for users to migrate their existing TCP/IP net-

Continued on page 58

The importance of protocol

A survey of 150 information managers among Fortune 500 firms suggest SNMP will be a more important network management protocol than either CMIP or CMOT this year and two years from now



SOURCE: INFONETICS, INC. CW CHART: JOHN YORK

Relief for strained backbones

BY PATRICIA KEEFE
CW STAFF

3Com Corp. recently introduced a series of products designed to provide users with intelligent routing bridge capabilities that can be used to offload traffic from overworked network backbones.

Routing bridges combine the functions of media access control-level bridges with added features such as intelligent path selection, network access security using custom filters and Source Explicit Forwarding (SEF) and network management functions to construct and manage large complex networks.

The latest rendition of the software, Version 2.0, designed for use with 3Com's internetwork bridge (IB) family of products, is compatible with three existing IB products, as well as two new bridges — the IB/2000 and the IB/2001, which are based on 3Com's Netbuilder internetwork platform.

Version 2.0 gives the IB line protocol independence and multiple path and security control benefits in one package, the vendor claimed. Among the product features are the following:

- The Spanning Tree Algorithm reportedly supports multiple

Continued on page 58

Inside

We Interrupt T
War For This Im

To all those unlucky enough to be stuck smack in the middle of the current spreadsheet confusion, take heart.

There is, at last, a viable alternative to war: revolution.

One that delivers even more performance than you have (ahem) been waiting for, but without demanding expensive new hardware or extensive retraining. And without abruptly cutting you off from any user in your company, even those on mainframes.

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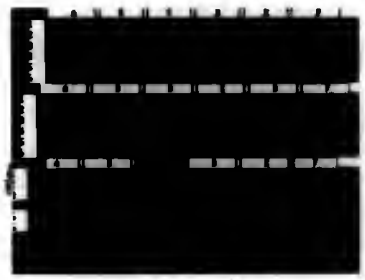

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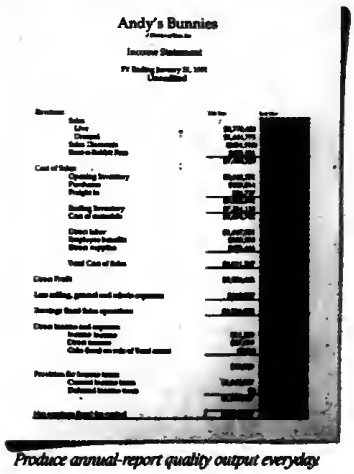
Catch bugs before they come back to bite you.

ne Spreadsheet portant Update.

to be precise. Linking either in memory or on disk, either pages of the same spreadsheet or independent, either SuperCalc5's files or Lotus® 1-2-3®'s.



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Which finally brings us to our admittedly biased outlook for the much touted spreadsheet war.

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COMPUTER ASSOCIATES

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Newspaper

CONTINUED FROM PAGE 49

tion in 1992, will be split into separate phases to avoid disrupting newspaper operations, ease project management and build on each layer of technology.

In the first phase, the *Sun's* news and advertising page-composition functions will be integrated via an Ethernet LAN, to be installed by midsummer. The equipment will include workstations for ad composition, terminals for editing news photos, input scanners and file servers.

Next, McCrystal said, the *Sun* will focus on a network to transmit facsimiles of the composed pages for printing. Initially, full-page facsimiles will be sent to an on-premises printing plant. But when the *Sun's* remote printing plant near the Baltimore harbor is completed in 1991, a wide-area facsimile network will be installed, he said.

This fiber-optic network, called Hydra, supports T1 and microwave links at speeds up to 2M bit/sec. Hydra was developed specifically for the controlled transmission of high volumes of text or image data to remote printing sites.

Meanwhile, the *Sun* will be implementing Crosfield's Graphic Arts Local Area Network (GALAN), a fiber-optic net with a very wide bandwidth for handling high-resolution color graphics, McCrystal said.

GALAN uses the Token-Ring topology based on Fiber Distributed Data Interface (FDDI). The FDDI specification adds a measure of fault tolerance to the network, McCrystal said, noting that an FDDI net will reconfigure itself to recover from faults.

"We're constantly on deadlines and we just can't have failures," he said. "We can't tell people, 'Sorry, we're not going to produce the paper this afternoon.'" The *Sun*, owned by the Los Angeles-based Times Mirror Co., publishes morning and evening papers.

Not only does the graphics LAN run at 100M bit/sec., it runs at about 80% efficiency — meaning that 80% of the bandwidth can be filled with real data transmissions. The GALAN system will be completed in the first half of 1990, McCrystal added.

McCrystal said the fact that GALAN complies with the Open Systems Interconnect model was another point in its favor. "One of the major factors in the [request for proposals] was that all of the products, hardware and software, had to conform to the standards of the future," he observed.

In the past, newspapers have been very dependent on particular vendors because they bought only proprietary systems. "For years, newspapers have argued that they have unique requirements, so they've always invented one-of-a-kind solutions," McCrystal said. "But those [custom] systems are difficult for users to manage, and they aren't very profitable for vendors."

MANUELLO PAGANELLI

"WE'RE NOW ready to replace various stand-alone systems, so we're taking this opportunity to implement our philosophy of integrated systems."

JAMES P. McCRYSTAL
THE BALTIMORE SUN

The final phase of the systems overhaul will consist of editorial design and page-information control systems, which provide management with centralized control over the integrated systems.

Paper net

The contract for *The Baltimore Sun's* networking project, based on a demanding request for proposals (RFP) drawn up by a user committee, will be implemented in phases during the next several years, with completion targeted for 1992.

The detailed specifications in the RFP were developed by a committee of 12, only two of them from the IS department, James P. McCrystal noted. "It was very refreshing to see all of the disciplines — news, advertising, production and information systems — come together and produce a requirements document," he said.

McCrystal called it a "first-class document that describes the business of *The Baltimore Sun* the way we want it to be through the rest of the century."

MITCH BETTS

Igniting ISDN vendors' fuses

BY ELISABETH HORWITT
CW STAFF

With the gradual firming up of Integrated Services Digital Network standards and the growing availability of ISDN-based products and services, corporate users are no longer dismissing the industry standard with the label: "Inane Services [We] Don't Need."

More than 40 user companies are now implementing ISDN networks. While some of these installations are field trials, carriers have begun making commercial ISDN services available. AT&T already has brought out its Primary Rate ISDN service, while both MCI Communications Corp. and U.S. Sprint Communications Co. have indicated that they will introduce their own services by early next year. Regional carriers such as Southern Bell Telephone and Telegraph Co., the Chesapeake and Potomac Telephone Companies and Southwestern Bell Telephone Co. have introduced ISDN services either as commercial or special tariffs.

The U.S. market for ISDN services should grow from $200 million this year to $17.8 billion in 1998, according to Eastern Management Group. If traditional carriers do not move quickly enough to fill the service gap, others will step in, said Warren Williams, a senior consultant at the Parsippany, N.J., research firm. Two likely groups of candidates are enhanced service providers such as McDonnell Douglas Communications Systems Co. subsidiary Tymnet and Fortune 500 service companies such as Sears, Roebuck and Co.

THE U.S. market for ISDN services should grow from $200 million this year to $17.8 billion in 1998, according to Eastern Management Group.

The spread of ISDN services should in turn help launch the still-sluggish ISDN equipment industry, Warren said. Indeed, that market is already heating up, as shown by the following recent and pending announcements:

- Apple Computer, Inc. recently hired a product manager, so an ISDN board for the Macintosh is likely to be in the works.
- Northern Telecom, Inc. has demonstrated but not yet announced a Macintosh board of its own. Northern Telecom already offers ISDN boards as well as software for basic personal computer communications functions, such as screen-sharing and file-transfer capabilities.
- International Computers Ltd. in Stamford, Conn., last week announced an OS/2 Extended Edition version of its proprietary ISDN workstation, which reportedly can maintain up to five concurrent sessions over an ISDN link.
- Teleos Communications, Inc. and Lachmann Associates, Inc. are jointly developing an ISDN board for Unix systems running Transmission Control Protocol/Internet Protocol.
- Vadis, Inc. in Richardson, Texas, a start-up that arose last May out of the now-defunct Compaq Computer Corp. Telecompaq group, hopes to announce an ISDN hardware and software product around June that will provide file sharing for personal computers as well as a call manager that will handle both voice and data transmissions, screen sharing and other capabilities.
- Raleigh Technology Group, Inc. in Raleigh, N.C., expects to announce its first ISDN software product soon, which will target vertical markets such as law, real estate and banking. The products will provide such industry-specific functions as automatically calling up a law firm's client database on-screen when the client calls. It will also use existing PC-based generic ISDN applications.

AT&T clears path for ISDN linkage to hosts

AT&T Network Systems has brought out a device that is said to allow local carriers to deliver CCITT X.25 packet switching to customers' hosts over an Integrated Services Digital Network (ISDN) link.

The Highgate module for AT&T's 5ESS digital switch is designed to be connected to a front-end processor for a variety of host machines, including those from IBM, Amdahl Corp., Unisys Corp., Digital Equipment Corp. and Hewlett-Packard Co.

The module itself is a gateway to an X.25 packet-switched network managed by the customer's telephone company and running over ISDN Primary Rate Interface links that support speeds as high as 1.5M bit/sec.

ISDN allows users to implement high-speed host links over a switched digital network that is potentially less costly than dedicated digital links.

Telephone companies will be able to provide the X.25 connections over central office-based local-area network services, which support data communications among corporate sites within one local access and transport area, AT&T said.

The cost per line is 60% to 80% less than it would be for dedicated channels connected to the mainframe's backplane, AT&T claimed.

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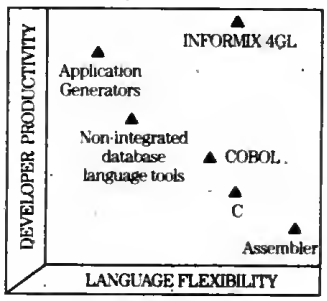

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Host access made simpler

Two releases take some sting out of the need to transfer data

BY PATRICIA KEEFE
and PATRICK WAURZYNIAK
CW STAFF

End users and corporate programmers eager to sidestep complicated, time-consuming host-access procedures may want to look at two recent product debuts.

As demonstrated at a recent trade show, Now PC/Host from Attachmate Corp. of Bellevue, Wash., streamlines the cumbersome process typically required to transfer data between a personal computer and an IBM host.

It automates the command structure of IBM's High-Level Language Application Programming Interface by replacing multiple screens of awkward commands with a simple menu of choices. The product costs $195.

On the programmer side, a $595 version called Author provides a series of macro commands said to enable users to customize Now programs.

Also targeting programmers, Aspen Research of Burlingame, Calif., unwrapped Mozart, said to enable development of PC-based front-ends to support simplified user access to mainframe and midrange systems.

Mozart combines the application-to-application communications of Aspen's former Enter 3270 product with such additional capabilities as 5250 support, a built-in screen painter, an extended window manager and an integrated database.

Great-West Life Assurance Co. in Englewood, Colo., uses an Enter 3270 front end to enable unsophisticated PC users at a dozen field sites to furnish about 250 customers with access to IBM 3090 mainframes at its Manitoba headquarters.

"As far as the capability they [say Enter 3270 has], it does that quite well," said Karl Berry, Great-West's assistant manager of systems support. "We took [Mozart] a step further and built scripts with IBM's TSO time sharing option."

As with Now PC/Host, the key to Mozart is that the user is shielded from the underlying mechanisms. "They just see the pretty screens," Berry said.

Walter Tate, systems analyst for Atlanta-based Life Insurance Co. of Georgia, said Enter 3270 came in handy last year when the insurer needed to change some software packages. Previous efforts to adapt the programs were stymied by the manufacturer, who would not allow any changes to the underlying code.

"It's a real good development tool, and it enabled us to do things we couldn't do any other way," Tate said.

Mozart costs $500 and reportedly runs in conjunction with most standard 3270 and 5250 emulation products.

NEW DEALS

Four companies recently became major implementors of **Hewlett-Packard Co.'s** Private Packet Network line of X.25 products.

Hertz-Europe has implemented a backbone network to connect its car rental outlets, using not only HP's switches but also its network management services.

Longs Drug Stores Corp. has implemented HP X.25 switches in order to connect 240 retail drug stores throughout six Western states.

SGS-Thomson Microelectronics chose HP's products to connect Digital Equipment Corp. and IBM systems, as well as HP hosts.

The Singapore Stock Exchange is using the vendor's switches to handle trading volumes of up to 118 million shares per day among 30 member brokerage firms.

After six years of planning, **California State University, Fresno** and **Fujitsu Business Communications Systems** have announced a 10-year, $17 million contract for an integrated telecommunications system on the university campus. Fujitsu will construct both a broadband network and a fiber-optic cabling system to support the school's interactive data communication and instructional television distribution requirements. The core component will be the vendor's Integrated Services Digital Networks (ISDN)-compatible F9600 private branch exchange.

The National Aeronautics and Space Administration's Communications Division has selected a micro-based X.25 packet-switching network to handle ground communications for a scientific satellite that will investigate black holes and other phenomena. **Asanet, Inc.** will supply the switches, which will support a backbone network transferring satellite data to project participants. NASA said it selected the X.25 standard because it links a variety of computer hosts.

Keefe

CONTINUED FROM PAGE 49

clear advantage over competitors.

It's obviously working. The privately held Banyan claims 100% growth during the last two years and is anticipating close to the same growth rate this fiscal year. Moreover, cheeky Banyan has gone up against the big boys and managed to snag a handful of impressive contracts, says Lee Doyle, a market analyst at International Data Corp.

Yet I can't help but wonder whether slow and steady will win in the long run. For example, as network traffic builds and demands to tie incompatible systems reach a crescendo, network managers — who also have to manage this nightmare — will undoubtedly find themselves less able to wait for the perfect product. Even if they grab something only as a stopgap, when push comes to shove, many will reach for that lifesaver.

Pundits are fond of holding up IBM as an example of how superior marketing can sell sometimes-mediocre products. The reverse is also true. The most technically superior product will rot on the shelf if you don't have the resources or know-how to market, distribute or support it.

If you look closely, Banyan appears to be in danger of falling victim to a squeeze play. On the high end, minicomputer and systems vendors are trying to connect into personal computer networks. On the low end, market leaders such as 3Com and Novell are pedaling furiously to extend their work group connectivity into the wide-area arena.

These firms are buying other companies, striking technology and service alliances with industry heavyweights and issuing statements of directions. The competition is very busy and very visible. They appear to be gaining on Banyan, which continues to plod along.

Most of the Fortune 1,000 is probably more inclined to entrust the technological lifeblood of their companies to a known entity. They're more likely to question Banyan's ability to stay the course for the long haul or to provide a full suite of services and products.

If Banyan wants to ease these concerns, it's going to have be a little less tight-lipped and a little more aggressive. While it continues to perfect and expand its technology, it had better pay attention to the other pieces that make up a solid contender.

Keefe is a Computerworld *senior editor, networking.*

TCP/IP

CONTINUED FROM PAGE 49

works to OSI network management. Although respondents indicated that they would have less interest in SNMP two years from now, interest in the OSI-based protocols is expected to increase only slightly, Infonetics found.

"There is a well-defined migration path from SNMP to CMIP, so people may expect to migrate in a few years," Infonetics Vice-President Steve Spanier said. "But even by 1991, there's not much interest — the most startling result for us. These people seemed interested in having integrated network management now, and there isn't much on the market." SNMP products are currently available from five to 10 vendors, including Wellfleet Communications, Inc. and Wollongong Group, Inc.; also, "I think IBM is developing one for [National Science Foundation network] NSFnet," Spanier said. In contrast, while most major host and networking vendors have announced CMIP-based products, few are now commercially available.

Backbones

CONTINUED FROM PAGE 49

physical paths, providing more efficient data routing and built-in redundancy.

- Custom filters can limit specific traffic to one network segment, establishing a secure network domain. They can also filter or forward packets based on protocols.
- SEF provides network administrator-defined workstations with exclusive privileges to access resources outside the local-area network segment.

After six weeks of testing, one early user, Kurt Rader, a senior software analyst at Oregon's Department of Environmental Quality (DEQ), gave 3Com's approach to routing bridges a thumbs-up.

If the IB/2000 continues to perform well during the test period, Rader said he plans to purchase five bridges: "We just plugged it in, and it's been very trouble-free, which is generally my experience with Bridge and now 3Com products."

He is anxious to relieve the traffic load rapidly building up on his backbone. Currently, the DEQ has an eight-floor 3Com network with 160 nodes supporting 300 users. Rader says the department is moving rapidly toward a 1-to-1 ratio of users to workstations and added that it will only get worse as the number of users climbs if something is not done.

"The traffic level has already reached the point where it is impacting the user, and come the end of the year [with more users on the network], it would be intolerable without these intelligent bridges," Rader said. Rader's plan is to use the bridges in conjunction with 3Com's Multiconnect product to isolate each of the floors from the backbone.

How will UNIX® System V affect your customer base?

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To find out more about UNIX System V and the UNIX Software Operation, call 1 800 828-UNIX.

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NEW PRODUCTS

Local-area networking hardware

A dot matrix printer designed to function as a shared networking device in local-area networking environments has been introduced by C. Itoh Electronics, Inc.

The 18-wire Prowriter CI-5000 reportedly features four print speeds and is compatible with the IBM Proprinter XL, Epson America, Inc.'s FX-286E and Digital Equipment Corp.'s LA210, LA75 and LA50 dot matrix printers.

The unit outputs 540 char./sec. in draft mode at 12 char./in. and 73 char./sec. at 10 char./in. in letter-quality mode, according to the vendor. Standard features include bottom and rear paper loading and a 15-character display, multifunction control panel.

Scheduled for availability in the second quarter, the printer will carry a price tag of $1,995, with quantity discounts available.

C. Itoh Electronics
2505 McCabe Way
Irvine, Calif. 92714
714-660-1421

International Communications Equipment Corp. (ICE) has introduced a product that incorporates a five-port active hub and an Arcnet interface onto a single board, according to the vendor.

Called the Icecard-5, the device reportedly resides in a local-area network server and can support as many as 35 users without the use of extra hubs. The product is compatible with Novell, Inc.'s RX-NET and is priced at $349.

ICE
Suite E
17945 Skypark Circle
Irvine, Calif. 92714
714-660-0191

Network management

Compuserve, Inc. is offering an enhanced on-line network management system to customers of its value-added packet data network service, the company said.

The on-line system reportedly allows users simplified access to all network administrator functions, including access setup control for user passwords, phone number lookups, electronic-mail facilities and usage reports.

According to the company, the network management system now provides troubleshooting and load monitoring functions as well as the tools necessary to shut down network links in the event of a data center outage.

The service is provided free to current Compuserve packet data network customers.

Compuserve
P.O. Box 20212
Columbus, Ohio 43220
614-457-8600

Links

A hardware platform that reportedly connects two or more geographically remote local-area networks into a single, integrated network has been introduced by Advanced Computer Communications.

The ACS 4100 is targeted at medium to large-scale users that require high-performance capabilities in network management, according to the vendor. The product reportedly features the Simple Network Management Protocol and open systems management protocol for heterogeneous systems in a networking environment.

Several software modifications are available, and the unit can be configured to function as a router or a bridge, the company said.

Data can be transmitted at speeds up to T1 rates over a single link, and two serial links reportedly can be split to connect LANs in different directions and transmit data at different rates. The ACS 4110, an Ethernet-bridge based on the ACS 4100 platform, costs $7,500. Pricing for the ACS 4100 will be released at a later date.

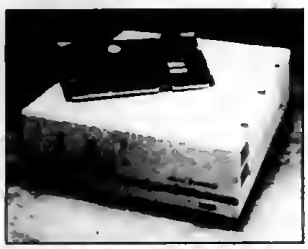
Advanced Computer Communications
720 Santa Barbara St.
Santa Barbara, Calif. 93101
805-963-9431

A network interface card with four serial communication ports, each said to support T1 transmission rates of up to 4M bit/sec., has been announced by Cisco Systems, Inc.

Developed as an option for the company's line of internetwork routers, the Serial Communications Interface (SCI) network attachment card connects to wide-area networks over asynchronous serial lines, the company said. The lines reportedly can serve either as dedicated circuits or as connections to public or private CCITT X.25 data networks.

The product comes in three versions: the SCI with four high-speed ports supporting rates up to 4M bit/sec. is priced at $7,100; the SCI with four low-speed ports supporting up to 64K bit/sec. costs $3,800; and a configuration of two high-speed and two low-speed ports is priced at $6,200.

Cisco Systems
1350 Willow Road
Menlo Park, Calif. 94025
415-326-1941



Cisco Systems' *internetwork router*

Tiara Computer Systems, Inc. has announced a software protocol designed to enable incompatible operating systems to share data via a Tiara Ethernet adapter board.

The Transmission Control Protocol/Internet Protocol-DOS program reportedly includes a file transfer protocol, terminal emulation and remote commands. It is slated to ship this month and will be priced at $495.

Tiara Computer Systems
2700 Garcia Ave.
Mountain View, Calif. 94043
415-965-1700

American Data Technology, Inc. is offering enhanced software with its Smartfax facsimile boards.

Designed for IBM Personal Computers and compatibles, Massfax provides mail-merge and broadcast-distribution capabilities. The software is bundled with the Smartfax boards and costs $664.

American Data Technology
44 W. Bellevue Drive
Pasadena, Calif. 91105
818-578-1339

MANAGER'S JOURNAL

EXECUTIVE TRACK

Theodore L. Boyer has been appointed executive vice-president at **Beneficial Data Processing Corp.** in Peapack, N.J., the information systems support subsidiary of Wilmington, Del.-based Beneficial Corp.

Beneficial Data Processing links Beneficial headquarters to its financial services office network with on-line telecommunications and decision support systems. The unit also offers data processing services to other Beneficial subsidiaries.

Boyer was formerly senior vice-president of data processing at Primerica Bank in Wilmington. Previously, he was vice-president of data processing at Beneficial National Bank USA, Beneficial's former credit card subsidiary.

Boyer holds a master of business education degree from Fairleigh Dickinson University and a bachelor's degree from Rutgers University.

Gary D. Dancy has been named vice-president of management information systems at **The Earle Palmer Brown Companies** in Bethesda, Md.

In his new position, Dancy will be responsible for all aspects of the advertising agency's information systems. Prior to joining Earle Palmer Brown, Dancy served as vice-president and MIS director at The Bloom Companies, Inc. in Dallas.

Who's on the go?

Changing jobs? Promoting an assistant? Your peers want to know who is coming and going, and *Computerworld* wants to help by mentioning any job changes in Executive Track. When you have news about staff changes, be sure to drop a note and photo or have your public relations department write to Clinton Wilder, Senior Editor-Management, *Computerworld*, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701-9171.

The house that Bob built

Tufts University's Curran crafts relationships and information systems

BY NELL MARGOLIS
CW STAFF

PROFILE: Robert J. Curran

MARTHA EVERSON

Position: *Executive director of computer services, telecommunications, Tufts University*
Mission: *Balancing the information needs of academic and administrative users and implementing a fiber-optic networking plan linking four campuses*

Like his father, Robert J. Curran is a builder. But even though he completely rebuilt his suburban Boston home 15 years ago, Curran's main aim is constructing information systems.

The 51-year-old executive director of computer services and telecommunications at Tufts University started his IS career in the U.S. Army, where he created a supply order system. In his current task — leading a major urban university to the front lines of computing — Curran is a creator of both computer systems and cooperation among the diverse groups that deal with them.

Like any good builder, Curran knows the value of a solid foundation. "A lot of IS shops fail because they don't really know where they're going — what's the policy, what's the philosophy," he says. Especially at a university, where the dollars are few and the demands are legion, he adds, "We can't afford to make a mistake. We have to have a plan, because we have no choice but to get it right the first time."

At Medford, Mass.-based Tufts, the IS foundation was pretty shaky when Curran was hired from a commercial IS career in 1982. The entire university was being served by a single Digital Equipment Corp. Decsystem-10, and calling the support staff a skeleton crew would be generous (see story page 66). But since 1983, Tufts' IS staff has more than doubled to 98 members, the computing budget has increased 300% and IS capital purchases, including 10 DEC VAXs and an IBM 3081, exceed $7 million in value.

"One of the greatest strengths that's enabled Bob to do what he's done at Tufts is his ability to see that one man couldn't do it," says William Durgin, the former Tufts vice-president who hired Curran. "He quickly realigned functions within the university and then went to vendors for outside help." Curran "was able to prioritize, to say, 'Here's what we have to do; I'll take the heat,' " adds Durgin, now vice-president of business affairs and treasurer of the College of the Holy Cross in Worcester, Mass.

Curran's ability to face up to difficult situations and construct a useful route through them extends beyond technology and even beyond enlarging the family home. Early on, for instance, he reacted to his fear of public speaking by attempting to learn the art. Since then, seminar leadership stints have taken him from South

Continued on page 66

Knocking down the organizational walls

BY CLINTON WILDER
CW STAFF

Fire up the sandblasters and the wrecking balls.

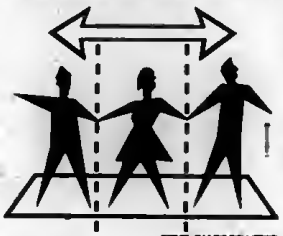
To implement truly strategic information systems, the IS executive and his company must knock down some organizational walls so that information can be shared among appropriate functions both within and outside the company.

"If a system doesn't cross traditional boundaries, it's not strategic," Nolan Norton & Co. President David P. Norton said at the recent Nolan Norton Institute symposium in Tarpon Springs, Fla. "You must rethink the relationship between the parts of your company as well as with customers and suppliers."

Thus, IS executives must not only understand their company's business, they must additionally work with senior management to break through what Norton calls "functional gridlock" — organizational structures that block the sharing of data across functions.

Norton cited Federal Express Corp. as a prime implementer of cross-functional systems. Federal Express' well-publicized package-tracking system involves sharing information among operations, customer service and accounting functions.

Other examples cited by Norton included the following:



BERT ZAMECNIK/TACTOR

- Firestone Tire & Rubber Co., which made tire-design information available to functions such as quality control, production and testing as well as to customers' engineers.
- Sundstrand Corp., which halved its warehousing staff and hastened customer-order processing by improving IS links among spare-parts ordering, warehousing and manufacturing control in the aerospace industry.
- Du Pont Co., which saved $13 million in textile-fiber plant maintenance by linking stores' control and accounting to the maintenance function.

As with so many IS success stories, partnership between IS and business management is the key. "If we're going to build systems for customers, we need to work with people who deal with customers," said William Synnott, a Nolan Norton consultant and the former chief information officer of Bank of Boston.

Survival of the informationally fittest

BY ALAN J. RYAN
CW STAFF

NEW YORK — Businesses that will do more than just stay afloat during the coming decade will have strong, information systems-minded executives at their helms.

That is according to the recent Arthur Young report, "The Landmark MIT Study: Management in the 1990s," which warned that significant technological investment without organizational change and thorough employee training is a prescription for failure.

The report was drawn from a five-year, $5 million research program conducted by the MIT Sloan School of Management.

The role of information technology will change more drastically in the next decade than it has in recent years, said Arthur Young Chairman William Gladstone in introducing the report.

As information technology moves away from its role as a support mechanism for routine tasks, companies must watch for innovations that could revolutionize some part of the business — no matter how small, the report said.

Information systems will also be a viable tool to bolster the revenue stream of all kinds of companies, according to the report. It suggested that companies establish a comprehensive information base for internal use and develop that information as a product for outside sales.

"Some U.S. industries have lost their competitiveness in the global marketplace because of failures to put technology to work for them," Gladstone said.

"Winning companies will understand the potential of new technologies early and act to ensure their competitiveness," he said.

> "SOME U.S. industries have lost their competitiveness in the global marketplace because of failures to put technology to work for them."
>
> WILLIAM GLADSTONE
> ARTHUR YOUNG

The report, based on the findings of business and government agency researchers, Arthur Young workers and Sloan School professors and investigators, also found that systems will be used by small companies competing against larger firms. It said that information systems will promote the emergence of strategic alliances among smaller firms.

Connectivity is a must, and those who plan to partake of such alliances should build an electronic bridge with strategic partners in the U.S. or abroad to assure the proper pace and level of information sharing.

In manufacturing, complex technologies such as computer-aided design and manufacturing and computer-integrated manufacturing may require a multiyear implementation. However, that time commitment can be worthwhile if it brings about a reduction in the time it takes to bring the company's products to market.

Technology "will open markets where there were none before and create new ways of buying and selling" during the next 10 years, according to Gladstone. The report said one of those areas will be electronic markets for manufactured goods, which are a logical follow-on to the success of electronic markets for airline reservations.

Executive support systems, used by a small percentage of top managers today, will become commonplace and easy to use — as well as critical — in the 1990s, the report said.

TAKING CHARGE

Clinton Wilder

Ch-ch-changes face the strain

If you had to choose one word to summarize the typical IS executive's mandate in today's business world, the word would be "change."

It's everywhere. Be a change master or a change agent. Transform your business using information technology. Change your organization, change your focus, change your philosophy of the information systems role in the corporation.

All well and good — in a perfect world. But how many IS professionals are finding that "change" often clashes with another word: survival?

That conflict occurs when the organization's propensity for change is significantly greater *or* lesser than the top IS executive's.

William Synnott, the former Bank of Boston chief information officer now doing consulting and research at Nolan Norton, put it well at his firm's recent symposium for senior business and IS executives in Tarpon Springs, Fla.

"Sometimes, the visionary CEO is matched with a punch-card-mentality CIO, who gets fired," Synnott said. "And other times, a punch-card CEO has a visionary CIO, who gets fired." The latter example was, perhaps, a subtle allusion to Synnott's own experience.

Change is not an easy task in many corporations; organizational inertia can be a powerful force. Consultants and so-called thinkers who evangelize that IS must throw out everything it has done for the past 20 years and start all over are, I hope, just employing the technique of hyperbole to get their point across, because that just isn't reality.

How many times have you experienced the following scenario? You're attending a conference at which panelists are spewing forth all kinds of good ideas about change. You're jotting them down with interest when suddenly a voice in your head says with a smirk, "Ha! I can just see trying *that* in my company. That's not the way they like to do things. I'd be out on my ear."

Like falling off a log

On the other side of the coin, there are companies that pull a sudden about-face and demand that their IS executives deliver competitive advantage to the business or else.

"Running IS used to have two goals — keeping users happy and netting zero," said Chester Frankfeldt, senior associate of research services at the Diebold Group. "Now it's like being the lumberjack in a log-rolling contest when the other guy suddenly changes the direction the log is rotating. Management is changing the rules."

And it's no coincidence that the turnover rate of IS chiefs at Fortune 1,000 corporations seems to be at an all-time

Continued on page 64

Relational executive think tank in the pipeline

BY ROBERT MORAN
CW STAFF

NEW YORK — Relational Strategies, a division of Computer Horizons Corp., has called for the formation of an Executive Users Group for Enterprise Architectures. The purpose of the group is to help senior information systems executives tackle strategic and tactical data planning in a relational environment.

At a seminar held in New York late last month, Martin Pelcyger, president of Relational Strategies, said that the proposed group would convene three times a year to review successful projects, exchange information and listen to academic and industry leaders speak about future directions and techniques in relational environments.

According to Pelcyger, five senior executives have signed on as charter members of the group, which will probably meet in June.

Just in CASE

The call for the group comes at a time when the IS profession has been awaiting IBM's repository and witnessing the increase of computer-aided software engineering tools. However, using the new technologies may pose problems for organizations that want to integrate their systems to maintain strategic advantage.

"The vast majority of companies that undertake the development of enterprise architectures and plans are not successful," said Steven Spewak, director of information architecture planning for Relational Strategies.

Spewak said that companies frequently fail because they do not understand that enterprise architectures are an evolutionary and data-driven process. He added that many companies lack the support and commitment of the organization or have ineffective project leadership and methodologies.

Wilder

FROM PAGE 63

high. "Now, we're demanding that IS professionals be businessmen and technologists," said one headhunter at a recent Society of Information Management chapter lunch. "You want to talk about a career path — it's off a cliff!"

Without the oft-publicized partnership between senior management and the IS function, this is the unfortunate truth. When the stars of IS tell their stories — from Federal Express to Du Pont to USAA Insurance — they almost always begin by praising the CEO and his vision of how technology could help the business.

That's not just boss-stroking; it's a strong reminder that important changes in IS can be achieved only when IS and business management are willing to effect change at the same pace and in the same direction. When that occurs, change can go hand in hand not only with survival, but with success.

Wilder is *Computerworld*'s senior editor, management.

CALENDAR

IS security issues will be the focus of the Share 72.5 Interim Seminar to be held May 14-17 in Denver.

Designed for IS executives and managers and security specialists and technologists in large IBM shops, the seminar will cover topics such as network control and reliability, IBM systems control directions, artificial intelligence-based intrusion detection and legal issues. Sessions, which run May 16-17, will also cover management issues related to security. More information is available from Share, Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

APRIL 16 30

Dylaguo '89 Users Conference. San Antonio, April 16-19 — Contact: Sterling Software, Dylakor Division, 9340 Owensmouth Ave., Chatsworth, Calif. 91313.

Endevor User Conference. Hyannis, Mass., April 16-18 — Contact: Business Software Technology, Westboro Executive Park, 114 Turnpike Road, Westboro, Mass. 01581.

International Telecom Policies and Services. Dallas, April 17-19 — Contact: International Telecom Policies and Services, International Communications Association, Suite 716, 12750 Merit Drive, LB-89, Dallas, Texas 75251.

ISDN '89, The Fifth International Integrated Services Digital Networks Exposition. St. Louis, April 17-21 — Contact: Information Gatekeepers, 214 Harvard Ave., Boston, Mass. 02134.

IEEE Infocom '89: The Conference on Computer Communications. Ottawa, April 24-27 — Contact: Colin Desmond, Telecom Canada, 5th floor, South Tower, 438 Bay St., Toronto, Ont., Canada M5G 2E1.

National Design Engineering Show and Conference. Chicago, April 24-27 — Contact: Show Manager, Spring National Design Engineering Show, 999 Summer St., Stamford, Conn. 06905.

Advanced Manufacturing Systems Exposition and Conference. Chicago, April 25-27 — Contact: Cahners Exposition Group, Cahners Plaza, P.O. Box 5080, 1350 E. Touhy Ave., Des Plaines, Ill. 60017.

Federal Computer Conference West. Defense and Government Computer Graphics Conference West. Anaheim, Calif., April 25-28 — Contact: National Council for Education on Information Strategies, P.O. Box 41045, 901 West, 7315 Wisconsin Ave., Bethesda, Md. 20814.

Executive Uniform: Charting the Course of Unix into the Commercial Arena. Santa Barbara, Calif., April 26-28 — Contact: Office Computing Group, Suite 612, 148 State St., Boston, Mass. 02109.

MAY 1 31

Association for Systems Management's Information Systems Conference. Dallas, May 7-10 — Contact: Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

Decus. Atlanta, May 8-12 — Contact: Digital Equipment Computer Users Society, 219 Boston Post Road (BP02), Marlboro, Mass. 01752.

National Financial Computer and Automation Conference. New York, May 9-11 — Contact: National Plaxon, P.O. Box 1151, Englewood Cliffs, N.J. 07632.

Adapso's 70th Management Conference. San Diego, Calif., May 14-17 — Contact: Adapso, Office of Public Communications, Suite 300, 1300 N. 17th St., Arlington, Va. 22209.

JUNE 1 27

Computerworld Perspectives 1989: The Executive Conference for Strategic Information Management. New York, June 20-21 — Contact: Carter Communications, Suite 31-A, 211 W. 56th St., New York, N.Y. 10019.

WITH SO MANY DIFFERENT OPERATING SYSTEMS TO CHOOSE FROM, WHERE DO YOU DRAW THE LINE?

House

CONTINUED FROM PAGE 61

America to Europe to Australia.

"You can safely say he got over the fear," says David Brown, chief financial officer of a Boston-based firm and formerly controller at William Underwood Co., a food-processing firm where Curran served as MIS director before joining Tufts.

Nothing in the industry or on the lecture circuit prepared Curran for what he found when he took his IS act to the fabled groves of academe in 1982. Curran had not planned such a move, but neither had he planned a move to St. Louis, where Underwood's operations went when the firm was acquired. Curran's family roots run deep in Massachusetts; rather than make the trek westward, Curran said yes to Tufts, which was then casting about for its third MIS director in two years.

For a man who divides people into caretakers and change agents and proudly numbers himself among the latter, the Tufts job appealed as a challenging change of pace. "One guy I knew said to me, 'Academia — a year of work and then you can sit back and relax,' " Curran recalls. "If I could find the guy, I'd kill him."

Most of the software at Tufts is developed on campus but rarely from scratch. For efficiency's sake, Curran's department relies as heavily as possible on canned applications and co-development arrangements.

The results of this approach have been impressive, Curran says. For example, a fund-raising application package that Tufts co-developed with Waltham, Mass.-based Business Systems Resources, Inc. is only half-installed at Tufts. Nevertheless, BSR has sold some 20 packages to third parties, including Princeton University. Tufts, Curran hastens to add, receives no royalties; the university's benefit, he says, lies in being treated like royalty by the vendor.

Vendor cooperation has not been limited to software. Much of Tufts' hardware was received gratis after Curran's intercession. "I've traded the patches on my elbows for patches on my knees," he says.

Beyond the installation itself, Curran is pleased that the working relations between Tufts IS and faculty have made quantum leaps in the past several years. Much of the credit, says Tufts Vice-President of Finance Peter McKenzie, goes to the fact that Curran "is attuned to the sensitivities of a large organization."

Curran's talent for diplomacy has its limits, however, McKenzie adds. "At budget time, for instance, [Curran] is never easy to work with," he reports. "In fact, at that time, he's a real pain to work with because he's trying to get his group their share of the pie."

Next, Curran says, is network expansion, including plans to rewire the four-campus, 90-building Tufts sprawl across a fiber-optic backbone. "Our biggest goal for the next two years," he says, "is planning for the next 15."

Picking up the pieces

The Tufts University computer setup, as Robert J. Curran found it seven years ago, was minimal. The college had a single Decsystem-10.

According to the university's organizational chart, the computer services staff numbered 19; however, Curran says, only six of the positions were actually filled. Of three jobs authorized for academic computing support, he says, only one was filled — that of the newsletter editor. Systems programming consisted of one student.

Demand for computer services, however, was as fierce as supply was short. The department was caught between academic and administrative users, each feeling slighted in favor of the other. "What was left of the computer services department had circled the wagons into a defensive position," Curran says.

The self-avowed change agent and lover of challenges had more than met his match. "Looking back," Curran says, "we were pretty close to the edge. I thought I knew what I was getting into, but truthfully, I had significantly underestimated the technological and the political depth of the problem. If I had to do it again, I'm not at all sure that I would."

But back in 1982, the builder simply forged ahead. First, to keep chaos at bay, he brought in a VAX-11/780 and increased the department's staff by 10. Then he began to lay the foundation for future computing at Tufts.

Today, the Decsystem-10 has been replaced by 10 DEC VAXs. In addition, Tufts colors now include Blue, at least in the IS department, where an IBM 3081 holds sway. There is also an Encore Computer Corp. system, two Wang Laboratories, Inc. VS office support systems, a slew of technical workstations, and a full-fledged computer-aided design system.

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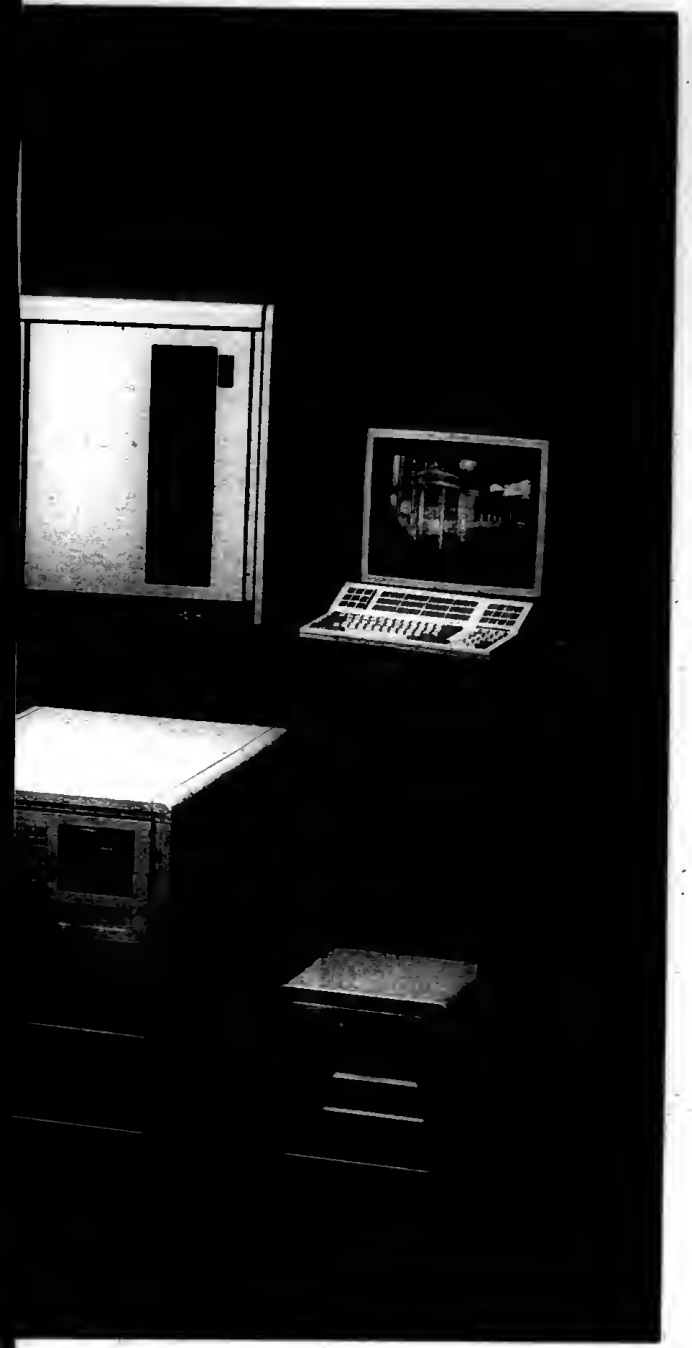

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INTERGRAPH

MANAGEMENT BRIEFS

Conference on software standards calls for papers

Fedcase '89, a conference designed to explore software standards and data management solutions for software engineering environments, has issued a call for paper submissions.

The conference, sponsored by the National Institute of Standards and Technology, will be held in Gaithersburg, Md., Oct. 30 to Nov. 2.

Proposals are requested for minitutorials, workshops and panel sessions. Suggested topic areas include computer-aided software engineering (CASE)-related standards and industry trends, data management research for software engineering and data-oriented CASE applications and methodologies.

For more information and rules regarding submissions, contact Fedcase '89, Margaret Law or Wilma Osborne, National Institute of Standards and Technology, Room A266, Building 225, Gaithersburg, Md. The deadline for submissions is May 15.

A Corning Glass Works executive and two **IBM** senior vice-presidents were honored recently at dedication ceremonies for **Syracuse University's** Center for Science and Technology in Syracuse, N.Y.

Richard Dulude, group vice-president of telecommunications at Corning Glass Works; Carl J. Conti, senior vice-president and general manager of IBM Enterprise Systems; and Patrick Toole, senior vice-president and general manager of IBM technology products, were honored for their continuing interest and involvement in the university's research activities and were presented with Chancellor's Medals.

All three were instrumental in starting Syracuse's Center for Advanced Technology in Computer Applications and Software Engineering Center, according to center director Bradley Strait.

Applied Computer Research, Inc. (ACR) has issued a call for participation in the fourth annual conference on Improving Productivity in EDP System Development, which is scheduled to be held in Phoenix, Jan. 22-26, 1990.

Speakers, panelists and chairpersons are being sought for the conference. No formal papers are required, although copies of handouts and visuals will be required later. ACR said that user experiences and case studies presented by information systems managers and their staffs are desirable. The conference is mainly oriented toward management issues.

Possible topics include CASE technology and trends, maintenance productivity, software development tools, human factors and motivation, software metrics, quality assurance, project management, information centers and end-user computing.

For more information on the conference, contact ACR at P.O. Box 9280, Phoenix, Ariz. 85068. The deadline for submissions is May 1.

The IEEE Computer Society has issued a call for papers for its conference on systems integration to be held in Morristown, N.J., April 23-26, 1990.

The conference will focus on the problems, issues and solutions of integrated systems design, implementation and performance. Integration technologies will be emphasized with a focus on CASE, collaborative and distributed systems and computer-integrated manufacturing systems.

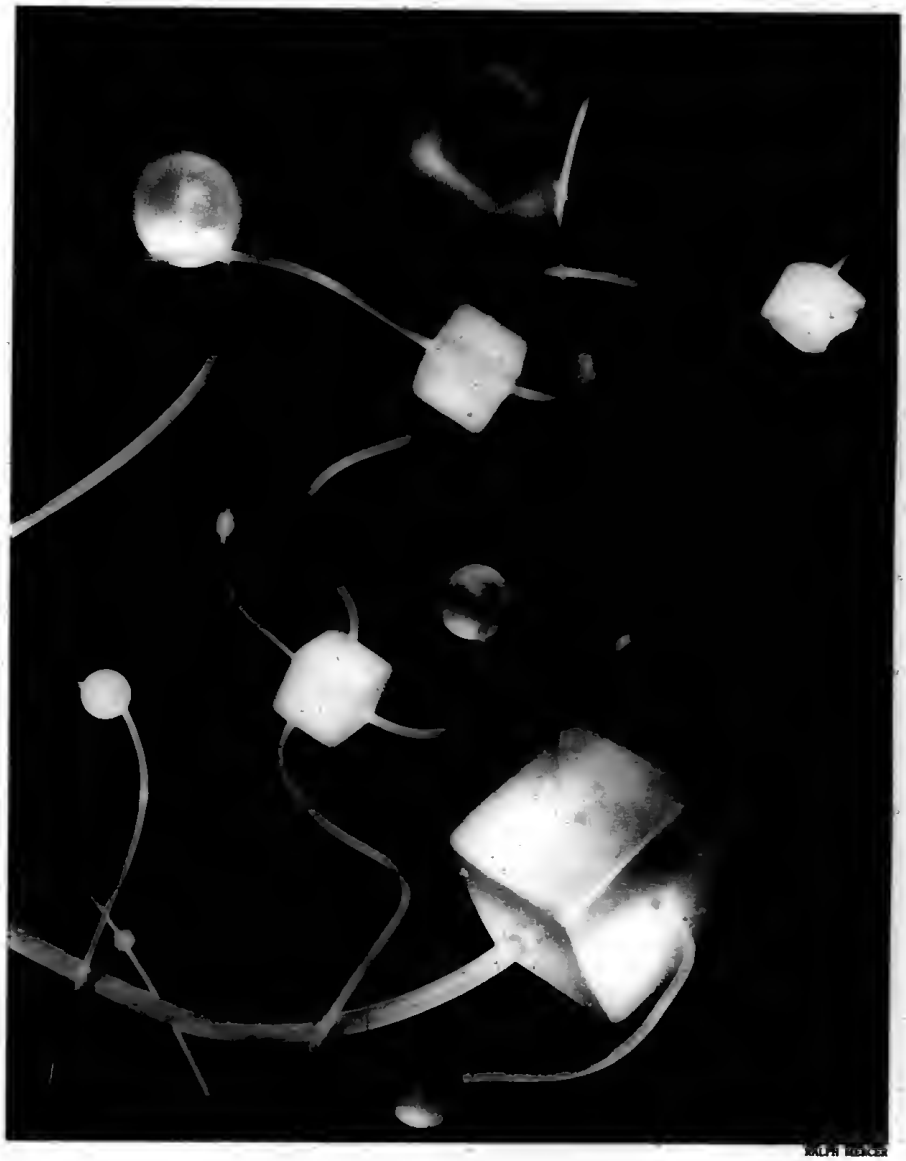
Authors should submit original technical papers to the program chairman no later than July 25.

For more information, contact Professor Peter A. Ng, program co-chairman, Department of Computer and Information Science, New Jersey Institute of Technology, Newark, N.J. 07102.

SPECIAL REPORT

INNOVATIVE CONNECTIONS

The ties that bind PCs and hosts empower organizations



RALPH REECER

- **A user's do-it-yourself link enriches decisions**
- **Preaching coprocessing, practicing it with CASE**
- **The struggle to integrate Macs and VAXs**

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PCs and hosts shake hands to do business

Call it what you will: PC integration, micro-to-mainframe links, coprocessing. The point is that today's managers need to make "just-in-time decisions" — in the words of Robert Trenchard, Sony Corp. of America's senior vice-president of MIS — in the executive suite as much as on the factory floor. That need is fueling the drive to tie PCs to mainframes throughout the U.S. and worldwide. But there are as many manifestations of the trend as there are companies and governments pursuing it.

At Sony, the IS organization must deliver data quickly and accurately to provide better customer service. The technological response is to have coprocessing systems linking desktop and host computers. But the immediate concern for IS is to practice what it preaches and put micro-to-mainframe links to work with CASE tools, which have boosted programmer productivity sixfold in one pilot project.

At the New York State Department of Health, an innovative system was both driven and implemented by a user. It downloads graphics from a mainframe to PCs, responding to a directive from the department's commissioner that decisions be based on comprehensive information, not fragmentary data.

A homegrown PC interface lets analysts at the International Monetary Fund access four different host systems, including the newly automated library card catalog. Library Director Michael Gehringer says this application eliminates the expense of maintaining half a million cards. It also frees librarians from mundane chores.

Spalding Sports Worldwide is equipping salespeople in field offices with laptops, eliminating the need for the sales support staff to print out and mail massive reports and freeing the salespeople from their own paperwork. As Sales and Marketing Vice-President Charles Yash notes, however, the chief motivation is to improve customer service.

Chevron Chemical Corp. has pushed to make it easier for analysts and executives to manipulate data from the mainframe. The Fertilizer Division boosted one year's sales by $500,000 with a single type of report.

The Burlington Coat Factory's new warehouse LAN supports a fundamental shift in distribution. A new distribution center now centralizes inventory tasks with PCs, a workstation and a superminicomputer linked to a remote mainframe. Vice-President of Operations Mark Nesci says savings in store space and manpower flow straight to the bottom line.

At Unocal Corp., a LAN has streamlined operation of miniature refineries used in developing new products. Using a mainframe to track tests on sample products was cumbersome and error-prone. Now, the network, with its PC database, is easier to use and issues bar codes to enhance accuracy and then uploads data to the mainframe.

At Lawrence Livermore National Laboratory, researchers have sought to free themselves from the expense and clutter of numerous desktop computers and terminals by tying systems to one machine. There'a a catch, though: Their tastes run toward incompatible Digital Equipment Corp. hosts and Apple Computer, Inc. Macintoshes.

None of these technologies are ideal solutions. But while managers cite shortcomings, they also point to payoffs, often in hard numbers. Sometimes, these benefits appear to transcend saving or even making money.

At the New York Health Department, user Mike Zdeb says it's almost a social duty to make better use of masses of mainframe data on diseases and other issues. "Otherwise, it all means nothing," he says. •

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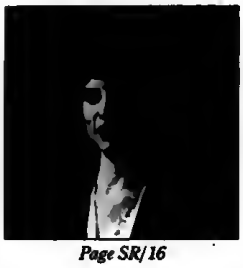

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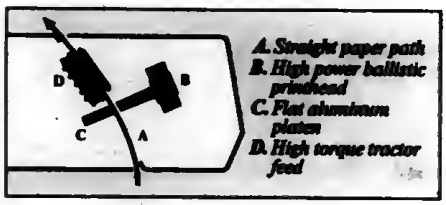

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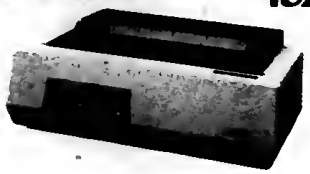

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User seizes the initiative at N.Y. Health Department

BY GLENN RIFKIN

Mike Zdeb loves his work — which is lucky for the New York State Department of Health.

Zdeb is the type of personal computer user that MIS often fears rather than embraces. Instead of railing against a difficult-to-access mainframe environment, Zdeb, a research scientist in the Information Systems and Health Statistics Bureau, took it upon himself to figure out how to work within that world. In the process, he has boosted the value of the Health Department's information base beyond all expectations.

Through tireless research and endless tinkering, Zdeb has effectively booked the department's vast IBM mainframe environment into the PC world to produce quality graphics and mapping for the bureau's myriad reports. As a result, a thick wall that had prevented researchers from gaining interactive access to vital data is tumbling down.

The Health Department has clearly embraced Zdeb's work. According to Vito Logrillo, director of information science and policy, Zdeb is representative of a key group of users in the department who have taken the initiative in making mainframe data interactive.

JOHN MARTIN

Zdeb *gave the N.Y. Health Department's database a big boost*

A THICK wall that had prevented researchers from gaining interactive access to vital data is tumbling down.

"In government, the presentation of data is as important as the analysis of data," Logrillo says. "What Mike has done has revolutionized the way we look at data in the department."

Steve Kim, director of the Information Systems and Health Statistics Bureau, points out that Zdeb's work stems from a mandate set down by Health Commissioner Dr. David Axelrod seven years ago.

Because of the vastness and complexity of the mainframe environment, users faced endless obstacles in getting important data.

Axelrod wants to make data available so that decision making in the department is based on quantitative studies rather than anecdotal evidence. Work by users such as Zdeb has helped bring that vision to reality.

Axelrod merged the Computer Systems and Data Processing group with the Office of Biostatistics just over a year ago to form the Information Systems and Health Statistics Bureau. Prior to that, the DP people were content to run the computers and process the data; researchers were left to their own devices in finding ways to use the data.

By merging the groups, it was expected that the internal conflict would cease and stronger cooperation would be fostered. According to Kim, the move has worked extremely well. "The users have taken over MIS," he says.

"We start with nothing, and what we make out of it is policy," says the lanky, bearded Zdeb, reaching into a file cabinet filled with reports such as "Maternal Mortality in New York State" and "Cesarean Childbirth in New York State."

The reports are clean, easy to read and filled with clear, understandable maps and graphics — not as slick as many corporate productions but much more accessible than much of the fare from government agencies.

"Our job is to get people to make decisions based on the best information — to make it easier for people to get at this massive data that comes in here daily," Zdeb continues, picking up the cesarean report. "We produced this entire document on our own from data received from hospitals around the entire state. Now there is a task force in place to study cesarean births and find ways to lower their incidence."

For Zdeb, the challenge was finding a workable path from the department's centralized IBM 3081 environment down to the desktop. The standard approach in the department was to use SAS Institute, Inc. products for data analysis in a batch mode over MVS. End users had been standardized on VM for access to the mainframe. There was no interactive environment on the mainframe.

"We realized that we had better output devices off PCs than off the mainframe," Zdeb says. So he searched for tools that would help get the SAS graphics down to the PC level. He realized that finding a common graphics language was difficult, with many vendors' promises failing to materialize.

"Graphics tend to work only in a proprietary environment for a particular software package," Zdeb explains. "You need to find a true common graphics language."

Through a process of trial and error, Zdeb found a route from SAS Graph to Lotus Development Corp.'s Freelance on the PC. Using a program called Metafile from Zenographics, Inc. in Irvine, Calif., Zdeb discovered he could filter protocols such as Hewlett-Packard Co.'s Graphics Language from the mainframe to the PC and then to a laser printer.

Suddenly, reports that had taken weeks and months to generate could be done virtually overnight — with far better results. "We do the reports ourselves, and now the art unit just has to put a cover on it and staple it," Zdeb says.

Logrillo observes that studies that the department has been turning out for the last 30 years are being done more quickly and efficiently and are generating tremendous interest.

"We probably would have done the cesarean study anyway, but now this gets the staff much more interested and excited

SNAPSHOT

Challenge: To base decision making on a thorough analysis of data residing in a mainframe that offers only rudimentary graphics capabilities.

Response: End-user-installed software to convert mainframe graphics so they could be refined for presentation with PC-based graphics packages.

Rifkin is a senior editor at Computerworld.

about doing them," he notes. "It's not run of the mill anymore; it's fun."

More importantly, the new capabilities generate support from the entire department in terms of increased interest in new reports and studies, and this interest helps promote the information systems group when budget time comes around.

Users like Zdeb and Pam Akison, who is doing similar work with text processing, are catalysts for the spread of computing power to the researchers.

The department has set up a user lab complete with IBM PCs, Sun Microsystems, Inc. workstations and Apple Computer, Inc. Macintoshes, as well as printers and plotters.

According to Logrillo, the department has spent more than $250,000 on hardware alone for microcomputers, printers and plotters, most of which reside in a common user lab. Software costs are minimal — $4,000 for a site license for SAS Graph, for example — and are more than offset by the benefits of better and more timely reports.

Zdeb points out that the user lab in his group enables others in the Health Department to take advantage of the technology without having to duplicate the buying or building efforts.

Even with the merger of the two groups, the users must remain knowledgeable, Zdeb points out.

"If I don't ask the question, it doesn't get asked," he says. "You need to know enough about the environment to ask the right question."

JOHN MARTINI

N.Y. Health Department's *Logrillo, left, and Kim*

Zdeb had plenty of opportunity to work through the issues. Prior to obtaining the 3081, the department ran Digital Equipment Corp. VAXs. When IBM arrived, the two environments co-existed, and Zdeb found himself learning communications protocols to move data from one environment to the other.

THE USER lab in Zdeb's group enables others from around the Health Department to take advantage of the technology without having to duplicate the buying or building efforts.

As his experience with computers grew and his office bookshelves became lined with documentation binders, Zdeb suddenly found himself in great demand.

"I've acted as an interpreter for the staff," he says. "People now call me with their questions." Indeed, Zdeb has started offering courses in graphics and mapping for groups throughout the Health Department.

However, his expertise with computers belies his role as a researcher. His commitment means that he virtually works two full-time jobs. Also, because he is a state employee, his rewards come in the form of a certificate from the commissioner rather than raises and promotions.

"I'm not a state employee; I'm a research scientist. This is my career," Zdeb insists. "My mind doesn't shut down at 4:30. We have vital data pouring in here day after day, and it's almost a duty to find something to do with that data. Otherwise, it all means nothing." ●

A yen for just-in-time decisions aids Sony's drive for coprocessing

The key: CASE that itself integrates PC flexibility and mainframes

BY DAVID GABEL

Sony Corp. of America is hustling to provide managers with the information they need to improve customer service. That goal has dictated establishment of micro-to-mainframe integration on more than one level.

The demand for faster delivery of information stems in part from new business strategies, according to Jeff Dorn, controller of Sony Component Products Co., which sells electronic gear to personal computer makers and other manufacturers.

Sony's information systems were developed when Sony was less focused on supplying manufacturers, Dorn says: "Existing systems are aimed at the consumer market and the aftermarket. Our needs are more critical. If we don't deliver, we shut down production lines."

Selling goods to a manufacturer that uses just-in-time delivery requires specifying delivery times within a window as narrow as two hours, Dorn says. That need means people inside Sony must get detailed information on receipt of materials, turnaround time and value added as well as delivery schedules.

"The biggest problem is that we often don't get the information we need from our factories as we need it, so we can't provide good delivery information to our customers," Dorn says. "If we aren't responsive to those needs, someone else will be."

Dorn is working with Robert Trenchard, senior-vice president of MIS at Sony, to develop systems for interfacing with factories and salespeople, including micro-to-mainframe integration. "We're in the early end of the design process, and we found that you can really define your business quickly," Dorn says.

He expects salespeople to have access to information on the availability of products when they make pitches to customers. Data on accepted orders would then flow to factories and help generate information for procurement of materials needed to make the goods and, eventually, data on deliveries.

To foster this faster delivery of data, Trenchard's MIS organization is itself adopting computer-aided software engineering (CASE) tools that employ micro-to-mainframe links in an effort to speed system development.

ANDY FREEBERG

Sony's Trenchard *seeks speedy solutions for data delivery*

"The central problem is a lack of productivity with the programmers," Trenchard says. "Programming is a craft. It has a creative aspect, and it takes talent. Not everyone has it. Being a good manager in this area means getting the projects done without having to hire all the superstars."

The MIS organization studied the available tools and settled on the Information Engineering Facility from Texas Instruments, Inc., which uses artificial intelligence-like constructs to develop code. Moreover, it aims to let systems designers use the flexibility of a local workstation along with the power of a mainframe.

With this system, code is the last thing developed. The relationships come first. That means systems developers become business experts; if the systems designer is to develop a model of the business, he must understand the portions he is modeling — personnel, sales or any other department. Addressing this need for business expertise can delay creation of code, which is one easy measure of productivity in development.

"This is not easy to sell," Trenchard says. "CASE really reinforces the idea that you should think before you start writing code. So you don't really have anything to show for a long time.

"In terms of the user environment, our goal is to develop good cooperative processing," he says. "We are not at that point yet worldwide. For our MIS staff, the goal is to make application programming more productive."

The CASE system has boosted programmer productivity substantially, managers say. It converted 4,000 lines of its pseudocode into 55,000 lines of Cobol CICS code to run an interactive executive filing system and on-line scheduler that Sony was developing, says Phillip Kunz, manager of data administration.

In this pilot project, Sony saw a sixfold rise in programmer productivity, but it is budgeting for a 2-to-1 increase, Kunz says. In using the system, the designer first enters statements that describe the data to be used. The designer also establishes the links between the data files to be employed.

The system performs internal checks to make sure the data relationships are consistent; then it generates pseudocode to describe the relationships.

Data administration analyst David Levine says the approach speeds up his work. "Once you're used to the system, you can generate a query menu in just a few minutes," he says. "If we didn't have the system, it would take two or three days."

The system stores the data and the description of the data, including its relationships, in a global "encyclopedia" of corporate information.

Using this kind of approach, Sony's systems analysts developed a model of how the company works, which is stored in the data encyclopedia. The encyclopedia can then serve as the tool for changing and updating the computing systems that deliver management information. In response to a change in the way the company does business, a designer alters the corporate model, then the CASE system modifies system code to conform to the changes.

"A change in the company ripples through the model and the information system all the way to the documentation, which is generated automatically," Trenchard says. ●

[redacted]

Gabel is a free-lance writer based in Northport, N.Y.

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Merger helps propel easier data manipulation at Chevron Chemical

BOB HOLMGREN

Chevron Chemical's *Matto found icons to be to users' liking*

BY PHILIP J. GILL

Some managers believe that if they could just get to the data on the mainframe, their problems would be solved. But it's not always that simple. Setting up micro-to-mainframe links is the easy part. Often what users really need is more flexible tools to analyze and manipulate the data.

Like most large corporations, Chevron Chemical Co. in San Ramon, Calif., holds vast quantities of information in its glass-boothed IBM mainframe. Much of that data is in Must Software International's Nomad database management system. While Nomad's fourth-generation languages (4GL) and other tools are designed for easy access to corporate data, they have proved too difficult for Chevron Chemical's average end user, typically an executive or business analyst.

Instead of using the tools, the executives and analysts would tell the programmers what information they needed and the programmers would extract it, usually in the form of printouts. The users would then key the data into spreadsheets to do analysis and prepare their reports.

This approach was cumbersome, unproductive, error-prone and costly, not to mention untimely. "There was no guarantee that the information would be ready in the time frame needed," says Don Matto, Chevron Chemical's director of MIS.

Still, Chevron Chemical continued operating this way for a number of years, right through the 1984 merger of its parent company, oil giant Chevron Corp., with Gulf Oil Corp. The merger added two divisions as well as many Gulf executives to Chevron Chemical. Chevron's MIS systems tended to prevail, and some of the Gulf managers grew frustrated with the Chevron procedures. They began asking for more flexible data access and manipulation.

Requirements for viewing the data vary from one manager to the next, Matto says. Those needs, combined with a drive to improve quality and decentralize decision making, brought about an experiment in technology that has freed many Chevron Chemical users from the confines of mainframe information.

One afternoon in early 1986, Matto was discussing a proposed rewriting of Chevron Chemical's financial forecasting modules when he stumbled across the Metaphor system from Metaphor Computer Systems, Inc. in Mountain View, Calif. "I was talking to a financial analyst at Chevron [headquarters] about my problem, and he mentioned that they were evaluating Metaphor," Matto explains.

Metaphor makes and markets systems designed for data interpretation, which are installed at more than 200 sites within 100 corporations and government agencies, a Metaphor spokesman said. IBM owns 8% of Metaphor, whose workstations combine a graphical interface, file servers, database machines and an Ethernet local-area network as well as application software.

Taking a cue from object-oriented programming, Metaphor uses capsules that appear as on-screen icons and contain one or more programs or macro routines. These capsules are standard parts of either the system or third-party applications, and some have been developed by Chevron Chemical's own analysts from other tools.

Users create new applications and reports by linking capsules with lines on the display screen. They can alter the work by drawing new lines or inserting new capsules.

His appetite whetted, Matto arranged to participate in a demonstration. He also looked for similar products; the closest thing he found, he says, was Odesta Corp.'s Helix relational DBMS for the Apple Computer, Inc. Macintosh. Unfortunately, it was still in the development stages.

Users can manipulate data with icons that incorporate macros or programs.

"The Metaphor didn't have as many bells and whistles as Odesta, but it was ready now," Matto says.

He decided to conduct an experiment. Reluctantly, he says, Metaphor management agreed to "lend" him a few systems. Using real data from Chevron's mainframe, three programmers devised a mock business and created standard reports that Chevron analysts and executives produce. Matto says the results surprised him. "They did in three weeks what everyone agreed would normally have taken a year," he explains.

Matto won approval for purchase of $800,000 of the company's equipment, including 20 workstations. Despite the substantial cost, this installation was barely more than a pilot.

The experiment has paid off for Chevron Chemical, which now has more than 100 of the workstations and more than 800M bytes of file server disk capacity — a total investment of more than $1.2 million.

Chevron Chemical's Fertilizer division has the largest number of workstations. During one year, the division refined its system for allocating scarce products among customers, boosting sales by $500,000, Matto says.

In addition, the division saved an estimated $75,000 by generating its own answers to management's questions rather than turning to MIS and another $25,000 by creating presentations in-house rather than through an outside studio.

Doing that work in-house also means presentations can be changed at the last minute, assuring they are up-to-date when presented, says Holly Newman, a marketing analyst at the Fertilizer division.

One of the most valuable applications has been creation of a long-term plan for the division. Spanning four to five years, the plan includes projections for revenue, customers, products and costs. The long-term plan also allows analysts to track performance from month to month and week to week.

Another application tracks Chevron's railcars around the country three different ways — by car number, fleet number and railroad carrier.

In addition to enhancing productivity, Matto says the technology has fostered a cross-fertilization of applications and techniques among divisions. "The analysts are talking to their counterparts in other divisions," he says. "And they're trading capsules, which means they're beginning to standardize on the way they do things." •

Gill is a San Mateo, Calif.-based freelance writer.

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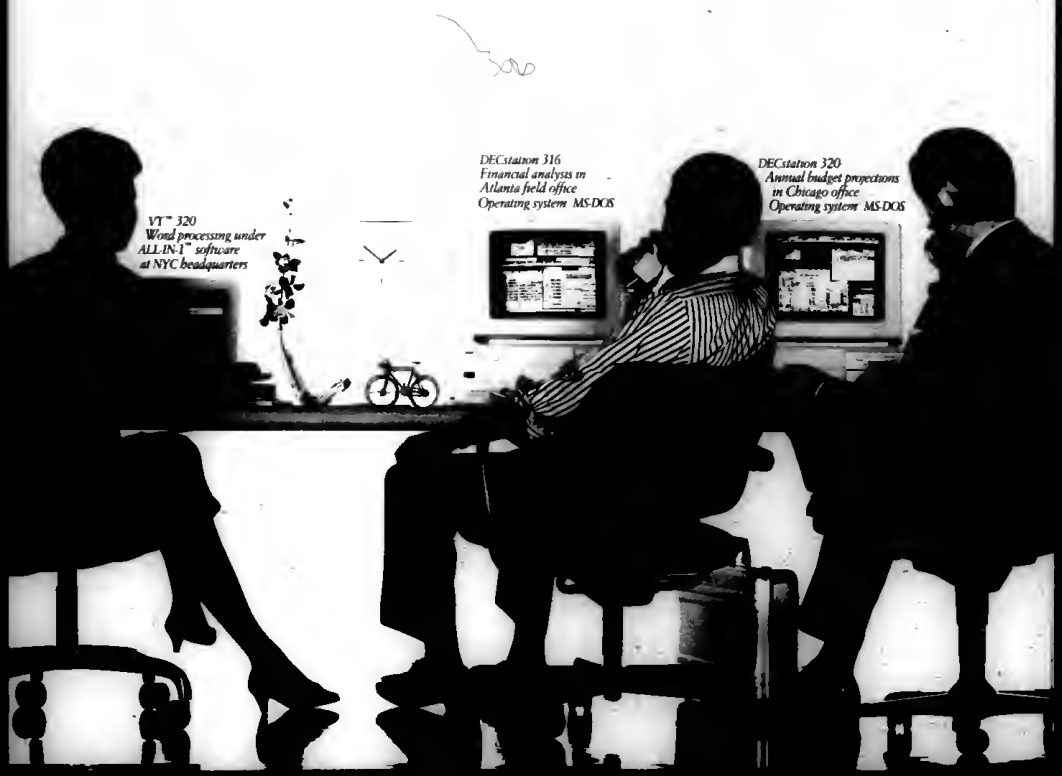

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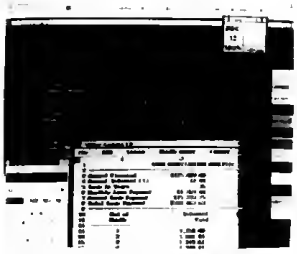

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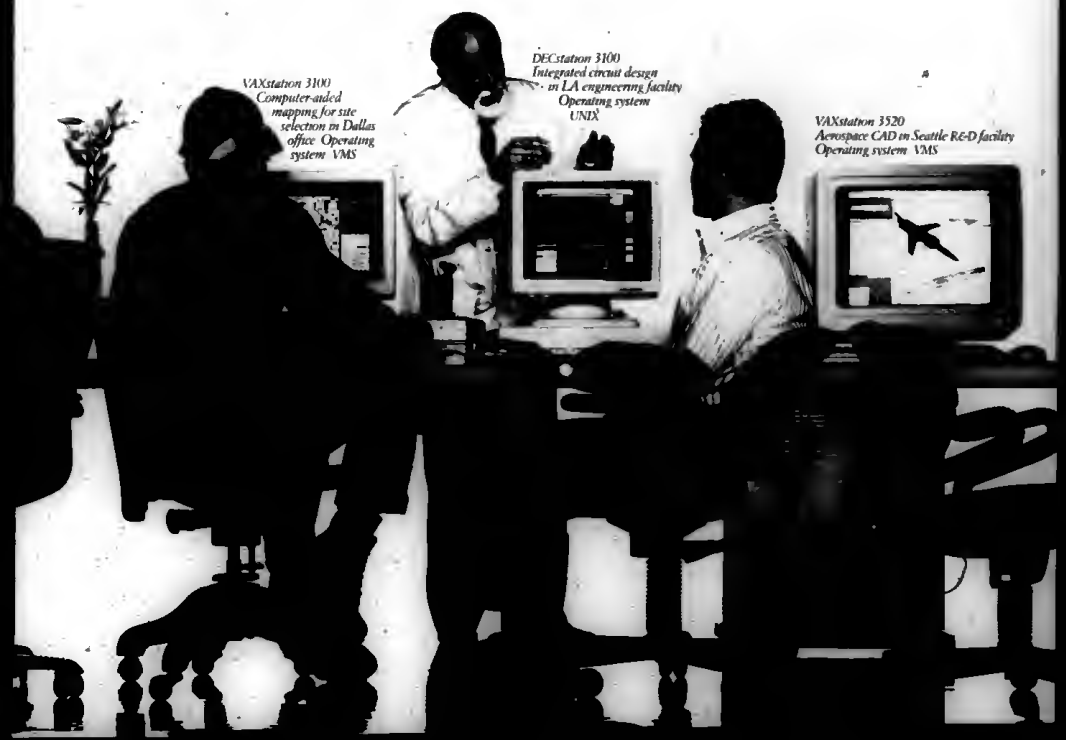

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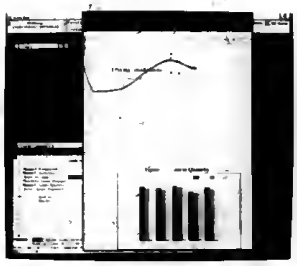
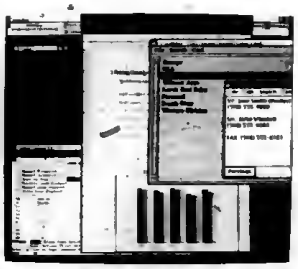


Using the same interface, you can display graphics running on a VMS computer to update your report



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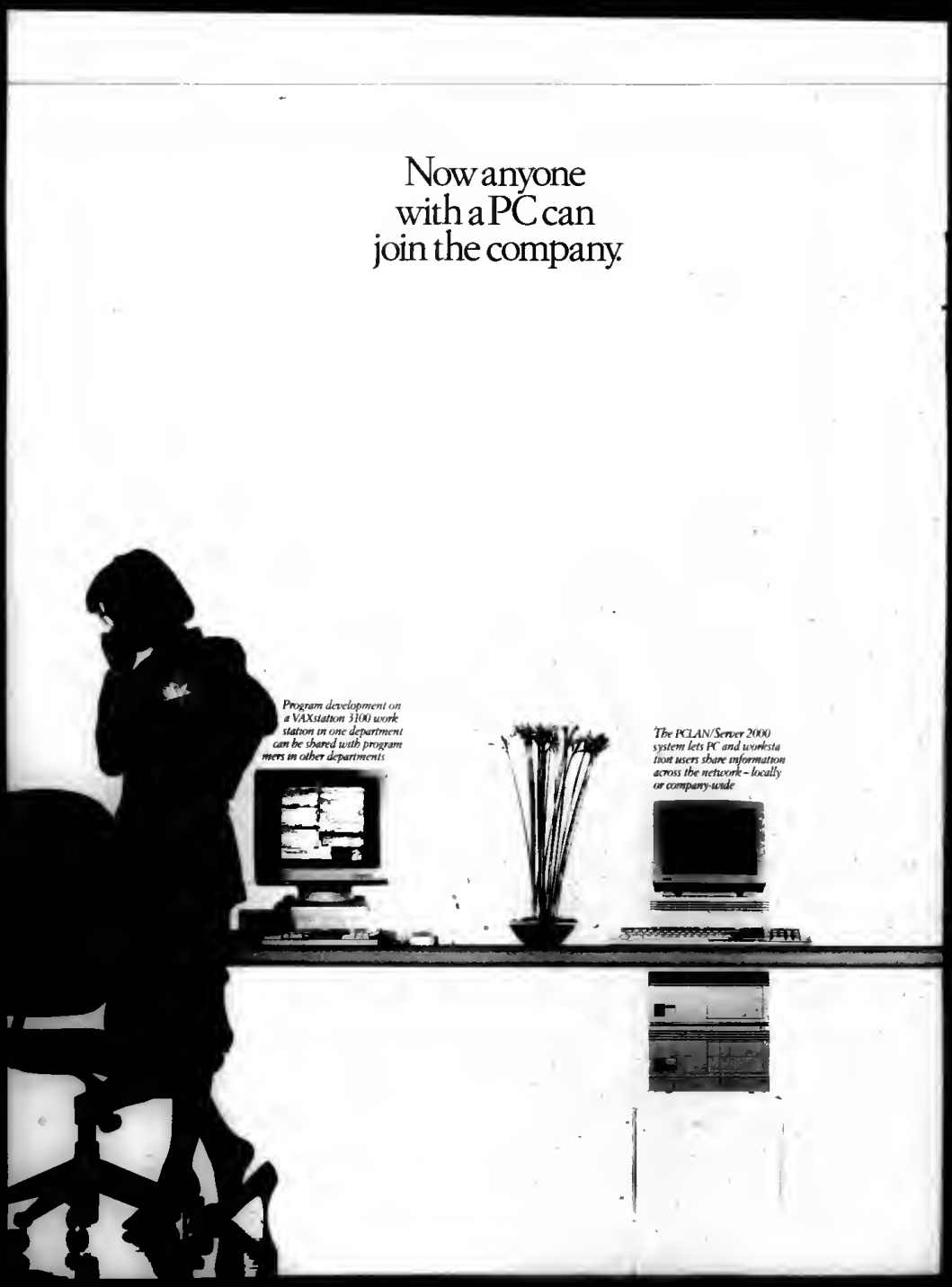

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Spalding Sports moves cautiously in pitching laptops to sales reps

BY ALAN RADDING

Sales representatives at Spalding Sports Worldwide spend most of their time alone covering their territory, but they are in almost constant communication with company headquarters in Chicopee, Mass.

The task of managing that communication rests with the sales support staff, which must continuously provide representatives with reports and information. As a program unfolds to arm the reps with laptop computers, the task is falling to the information systems department as well.

The objective of the program is to improve service to customers, according to Charles Yash, vice-president of sales and marketing at the Golf Products division. Ideally, Yash says, representatives taking orders will use a laptop to check whether goods are available and enter orders electronically. The products would be shipped by overnight mail Thursday to reach the customer before the weekend.

Several times a week, the sales reps receive status reports updating their monthly sales by product line. Toward the end of the month, the reports are generated daily so that a representative can adjust his efforts to meet his quotas. The rep will also call headquarters frequently for the latest information on an account and product prices.

"Every weekend we'd be running these massive reports and then spend a lot of money to send them out by overnight delivery," says Bard White, Spalding's director of MIS.

Sometimes reports were sent by facsimile, but the representatives were almost always on the road and hard to reach.

Overnight mail and the phone were the main methods of communication, White continues. But they were not sufficient. Communication with the sales force required constant report-generating efforts from MIS and ongoing telephone support as sales representatives called in.

Out in the field, the representatives were equally unhappy with the process. They were burdened with excessive paperwork, which was cutting into the time they had to spend with customers. The time they spent playing telephone tag with the home office or plowing through paperwork was time they couldn't spend selling.

The notion of providing the sales reps with laptops had been kicking around Spalding for a few years and had been broached by several people. Their ideas were all aimed at letting the representatives call into the central computer at any hour and download reports, send and receive electronic mail, ask about customer records and pick up price changes. They also might file orders and reports electronically, eliminating the need for the data to be keyed into the computer at headquarters.

An early effort at implementation did not work. "We couldn't control it. We couldn't train the users fast enough, and we couldn't support all those users," White acknowledges.

But the idea remained appealing because of the steady growth of business. "The pace of the growth was just taxing MIS," says Lori Basilone, Spalding's manager of sales information at the Leisure Products division.

Basilone's sales group and the larger Golf Products sales group were demanding more applications and data from MIS because, as she explains, "The representatives were demanding more information, faster" from the field.

Try again

Last October, Yash decided to try again, but on a much more controlled basis. This time, instead of a vague idea about computerizing the sales force, there was a more concrete plan.

The approach was to introduce laptops slowly rather than trying to computerize the sales force of 170 at once. First, district managers and a few representatives were issued laptops. Currently, Spalding has placed about 40 laptops in the field. Within three years, all the representatives should have one.

It will also take several years to get all the software and support for such service in place, Yash adds.

"We don't want to overtax the system and generate frustration by building expectations," he says. One thrust of the gradual approach is getting feedback from representatives in order to develop the applications they need.

For now, the representatives are getting the same applications used by the sales support staff at headquarters, somewhat modified by the MIS department. The modifications are aimed at ensuring data security by preventing salespeople from accessing information unrelated to their territories and adjusting the mainframe screens for the laptops.

Simply reproducing the applications used by the sales support staff, however, may not be the best approach, Basilone explains.

"We're going to have to learn. They may need something different from what we do in here," she says. One upcoming application is electronic forms, which will allow the field force to file their expense reports and other paperwork electronically.

After reviewing all the major

STELLA JOHNSON

Spalding's White *keeps the ball rolling with laptop-toting sales force*

SNAPSHOT

Challenge: To decrease the cost of printing and delivering reports to field sales offices and reduce the amount of paperwork that prevented salespeople from dealing with customers.

Response: Controlled distribution and support of laptop computers for sales representatives, providing communications, spreadsheets and word processing.

Radding is a Boston-based author specializing in business and technology.

brands, Spalding selected the NEC Corp. Multispeed HD with a 20M-byte hard disk, 640K random-access memory and a 2,400/1,200 bit/sec. modem. The laptop weighs about 24 pounds with its case. Representatives also get a stand-alone 150 char./sec. ink-jet printer.

Loaded into the system before delivery is Lotus Development Corp.'s 1-2-3, a communications package, a word processor and a security module. The MIS department also installs a menu-driven user interface.

The laptops cost about $5,500 each and are purchased through a national computer store chain. "If one of them breaks, the guy can bring it into the local store and get it fixed," White says. Otherwise, the representative can send the machine back to Spalding, and MIS will send out a new machine while repairs are being done. Most such problems develop when the machines are dropped.

'Idiotproof' laptops

MIS trains the sales force, spending several days with the user in a small group of three to five people. "We've made it as idiotproof as possible," White says, because the idea is to give the reps more time to make sales, not learn about computers.

Users leave the initial training session with their machine, a manual and a quick-reference guide. They also are given the details for accessing the GTE Telenet Communications Corp. public data network manually in case they are in an area where the automatic dialing installed by MIS is not appropriate. Before the machine leaves the home office, it is fully tested by MIS.

Some users are intimidated, White says, although many reps show genuine enthusiasm for the effort. If a user does have problems or seems anxious, MIS will work with that user individually.

MIS monitors the activities of everyone on the system. "We want to make sure that they are using it," White says. If MIS discovers that a sales representative is not using the system as regularly as he should — a clear sign is when use suddenly drops — it will contact the person and try to determine the problem. Once it has done so, MIS tries to solve it and encourage the user to get back on-line.

More often than finding timid users, however, MIS must deal with the overly adventurous. "One guy tried to hook up the phone in a 747 jet," White says, noting that phone jacks on those telephones are not removable. Other users get confident and try, unsuccessfully, to evade the security provisions to access other areas of the system, he says.

Step by step

Subsequent training sessions will concentrate on more advanced uses of the computer. Spalding is planning two-day sessions on 1-2-3. Once the users are acquainted with the spreadsheet, they will receive some specific spreadsheets already set up for them.

"We can't throw everything at them at once," Basilone says, "and we can't take them away from sales for long periods to train them."

Typically, the users begin by dialing up the Spalding mainframe every morning and downloading a status report on their orders and shipments. "The thing they are most interested in are their own numbers," Basilone says. The representatives work on straight commission under a stringent system that establishes not only overall sales goals but quotas for individual products.

Even at the preliminary stage, Spalding sees benefits from use of laptops. "We're seeing a reduced workload on the internal administration," White says. He notes that the sales support department has not hired additional people as sales have grown. MIS is also printing and shipping fewer reports.

Users are looking forward to the time when the system is fully operational. When the field force can take care of all its basic information and reporting needs electronically, it will free Basilone from providing the basic support that takes up the bulk of her group's time. "Then we'll be able to do much more in-depth analysis," she says. ●

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Network Systems.

International Monetary Fund opens user-friendly PC window on four hosts

A unified interface helps automate library shared with the World Bank

BY SHARON BAKER

The timing was fortuitous when managers of the library shared by the World Bank and the International Monetary Fund (IMF) decided to put their card catalog on-line. At the same time, the IMF was beginning to buy PCs, and its MIS organization was searching for an easy-to-use interface that would provide access to hosts from Digital Equipment Corp., Hewlett-Packard Co., Unisys Corp. and IBM.

"It became quite clear to us that we were going to go to a distributed processing approach," says Warren Minami, director of the IMF Bureau of Computing Services (BCS). "We had to find a systematic way of getting the PCs to [access] the various applications on the mainframes."

Today, that interface, PC Query, provides a window into the four hosts, including two newly automated library databases on the HP 3000. The new applications free librarians from routine chores and eliminate the expense of maintaining a card catalog of half a million records.

The Joint Bank-Fund Library serves employees at the World Bank, which grants loans for national development, and the IMF, another international agency that issues short-term loans to countries troubled by a poor balance of payments.

Minami and Ali Semsarzadeh, senior computer systems officer, along with Lakshmi Narasimhan, computer systems officer, could not find a product that would transparently transfer the user from one host to another and offer an easy-to-use interface. So they decided to develop one.

"It was not our desire to get into the software business," Minami stresses. "The only thing we were thinking about was solving user problems."

Meanwhile, the Joint Library, which had already automated several functions, wanted to give its users on-line access to its card catalog. The library was also undergoing a major relabeling of its books, changing from the Dewey decimal classification to the Library of Congress system, and did not want to update its card catalog as well.

Susan Turner, automation systems librarian, began working with the BCS four years ago. A little more than a year later, PC Query was born, followed in several months by the library's new system, Jolis Online, or Joint Library Information Services. Jolis includes both card catalog and bibliography databases.

Challenge: To provide unified, friendly PC links to incompatible host processors from four vendors.
Response: Internal development of a PC interface using a pioneering application of Windows.

PC Query, which works on an IBM Personal Computer XT or AT, sits beneath Microsoft Corp.'s Windows interface.

When a user calls up Jolis' card catalog database, a form appears that resembles a card. At the top of that form is a search-word category; the system will seek any word typed in that box in a number of fields — title, author, series, notes or subject. Users do not have to know the name of the book or author to find a particular item; one word will start his search. "Users seem to be able to just sit down and use [Jolis] with very little background," Turner says. "It's practically self-explanatory on the screen."

"This is a good first step toward developing a truly friendly interface that people can use without a lot of training and still get an honest and accurate response back from the system," says Michael Gehringer, head of the Joint Library.

As a manager, Gehringer says he appreciates Jolis because it has enabled his reference staff to do more extensive research and customer interaction rather than just look up books for clients. On-line access also saves the library the expense of maintaining a card catalog.

Implementing PC Query was not without problems. The biggest surprise, Semsarzadeh says, was that it took more than a year to do.

The fact that the IMF was one of Microsoft Windows' first users also created a few headaches. "It was not really worse than expected," Semsarzadeh says, "but Windows had bugs in it. It was slow."

Turner says Jolis itself still has some limitations that are being addressed. For example, when it downloads records, it does so in random-access memory, thereby limiting the number of records that can actually be brought in from a search.

Jolis also met some resistance from users who liked the card catalog and were upset when the familiar tool was taken away. "The process of thumbing through a card catalog gives users a serendipitous approach to research," Gehringer says. "They learn things they wouldn't ordinarily learn if they just got a computer printout."

The Joint Library currently has six PCs, and there are two in a satellite reference center at the IMF. Two more machines are planned for the Joint Library, and between 20 to 25 PCs should be placed throughout the World Bank and IMF libraries and information centers by the end of the year, Turner says.

Gehringer and Turner's ultimate goal is to give users some kind of remote access to PC Query, possibly allowing economists to conduct research without leaving their department. Minami — who was wary about his BCS going into the software development business — is inclined to proceed cautiously and is still looking for a third-party vendor to take over. ●

MANUELLO PIGANELLI/BOOZ•ALLEN & HAMILTON INC.

Turner, Minami *collaborated on automation of library systems*

Baker is a *Computerworld* assistant editor, features.

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Network Systems.

Retailer taps decentralized computing to power centralized distribution center

BY JANET MASON

Burlington Coat Factory network offloads data entry from stores

The Burlington Coat Factory Warehouse tracks its inventory down to the color and size of every garment, meaning each store carries some 650,000 stock-keeping units, known in the trade as SKUs.

Until recently, the 135 stores bore the brunt of keeping abreast of their inventories, receiving most merchandise directly from manufacturers and initiating the record-keeping process. "It's very difficult to track all those receipts," notes Mark Nesci, the company's vice-president of operations. More difficult still were the tasks of maintaining quality control and replenishing merchandise when a store's stock ran low.

To tackle these problems, Burlington has built a new distribution center in Burlington, N.J., where it receives, inspects and tracks merchandise centrally. At the center's heart is a networked, Unix-based merchandise tracking system combining personal computers, a Sun Microsystems, Inc. workstation and a superminicomputer from Sequent Computer Systems, Inc. tied to a mainframe in New Hampshire.

Mason is a Philadelphia-based freelance journalist.

Nesci says it is hard to put numbers on the value of the system or even on the center itself. But he says there is no doubt it will cut costs and reduce inventory control problems.

"It goes right to the bottom line, but it's very difficult to put that in dollar figures," Nesci says. "We have projected that in two to four years, we should recapture the initial costs of building the distribution center."

The network, conceived by Nesci with MIS Director Michael Price, helps Burlington ensure that it receives the goods ordered by buyers in New York. It also helps track items in the distribution center and see that they go to the right stores.

The MIS staff began installing the network last May. "In July, we did a full-scale testing, worked out the bugs and were ready for our busy season by the end of August," says Chris Kraemer, assistant manager of the distribution center in charge of data processing.

The system has boosted productivity about 70% from the level at a facility in Secaucus, N.J., with a less automated system that had centralized about 20% of the distribution and tracking, according to Kraemer.

The network has cut processing time for merchandise from seven or more days to three or four. "The ideal time is 48 hours," Kraemer says. "We expect to achieve this soon with enhancements to the network."

The tracking network's Sun 386I workstation provides a buffer between 30 PCs and the Sequent Symmetry S-81. It moves messages from PCs to the Sun, where they enter a queue. The Sequent reads the messages, processes the data and updates the Oracle Corp. database.

The machines are linked via Ethernet and Sun's Network File System. The network is tied to the mainframe with a 56K bit/sec. X.25 link.

The network is vital to the distribution center because if it goes down, no goods get processed, Kraemer says, so it is designed to run continuously.

"The Sequent rarely goes down," said Brad Friedman, DP mananger at Burlington's corporate headquarters. "If it were to go down, the Sun would do the processing and the system wouldn't stop. If the Sun were to go down, we would have our spare running in 10 minutes."

Burlington opted for the Sequent processor because of its power and cost-effectiveness and for Unix because of its portability among hardware and open architecture, according to Mike Prince, DP manager at the company's Lebanon, N.H.-based data center.

When goods reach the receiving department, the data entry staff keys merchandise numbers into the network. The network then matches the figures against buyers' records from the corporate mainframe. Data from the mainframe conveys how the goods are to be allocated among stores.

From the receiving department, merchandise moves to a sorting area, where it is broken out of cartons. Employees using handheld wireless terminals from Telxon Corp. record the movement of each piece of clothing. "At any moment, we can track where a piece of merchandise is," Kraemer says. "This is good for buyers, who may be in the building and want to see a piece of merchandise. It also allows us to track our production time."

Challenge: Receiving and tracking goods individually, a system that consumed space and manpower and complicated quality control.
Response: A centralized distribution center using local processing to receive merchandise and upload data on it to the mainframe.

The system creates bar code labels for outgoing cartons that include weight data generated from conveyor belt sensors. When the cartons reach the shipping area, they are scanned as they go out the door to verify unit count and destination. This data is printed onto a bill of lading, which is delivered with the goods. The network sends electronic messages to the stores telling workers there what kind of merchandise to expect.

Data on the network is uploaded to the mainframe, which tracks inventories for all stores by style, color and size. Buyers in New York use the mainframe data to reorder merchandise.

Friedman says the system was installed with little trouble: "At first we had a problem tracking goods with the system because it was new and we had some untested line applications. But primarily, the problems were small."

Prince says he plans to install more Sequents in Burlington and eliminate mainframe use in three years. "Eventually, we want to have everything that is now running on the mainframe running in a Unix-based Oracle database on Sequents," he says. ●

KEN KAUFFMAN

Friedman says it was little trouble to install the centralized system

Unocal taps LAN and PC database system to speed work of R&D facility

Relational DBMS eases data entry, prints bar codes and uploads data

BY MICHAEL HURWICZ

While the petroleum business has picked up in the last year, through much of the 1980s many oil companies were forced to cut back on employment. Even where the work load was growing, as at Unocal Corp.'s Science and Technology Division in Brea, Calif., organizations avoided increases in personnel.

"The general thrust is that we are expecting more of our operating people all the time," says Alex Barloewen, manager of processes and materials research at Unocal. "Any time we get rid of routine work, it helps streamline the operation."

One move made by the Science and Technology Division is the deployment of a local-area network-to-mainframe application to support 21 small oil processing units used to improve refining methods. The processing units operate around the clock seven days a week, producing samples of gasoline, jet and diesel fuel, solvents and petrochemicals.

The work of the units is crucial to Unocal, says Don Fenton, Unocal's manager of new technology development.

"Things are rapidly changing in this industry. If you don't change, you fall behind. If processes are ineffective and costs go up, you eventually become noncompetitive," Fenton says.

DBMS that can replicate redundant information and then upload it to the host.

One project involving the processing units, for example, has allowed refining of gasoline or jet fuel from heavy crude oil that previously would have produced only less profitable fuel oil, according to Barloewen.

The Science and Technology Division refines hundreds of sample products every day. But despite the introduction of mainframes in the 1960s, it was still identifying samples with handwritten tags in 1985.

The process went like this: An engineer would order tests on a sample. Technicians then bottled a portion, filled out a tag to identify it and describe the tests to be performed, attached the tag to the bottle and walked the bottle to the analytical laboratory in a neighboring building. There, a data entry clerk keyed information from the tags into the IBM mainframe. The machine generated printouts telling laboratory workers what tests to run. It also produced management reports.

Among other problems, however, management found that senior technicians were spending half an hour daily, and sometimes as much as two hours, filling out all the tags. Much of the information was redundant from tag to tag, yet it had to be repeatedly filled in and later rekeyed. Furthermore, data entry clerks sometimes misinterpreted handwritten identification numbers.

To make the process a more accurate one, in 1986 a group led by Dave Dalesandro, a computer scientist specializing in LAN systems support, revamped the procedure for some tests at one of the 11 labs. Technicians could then print stickers bearing the identification numbers, making them easier to read.

In addition, technicians began entering the information into the mainframe themselves instead of filling out the tags. This change was meant to reduce mismatches between numbers on bottles and what was in the computer and avoid the need for data entry clerks to rekey the information.

The new method improved accuracy, but it did not sit well with the technicians. First, they found it more difficult to use the mainframe than to fill out a tag. This difficulty itself led to mistakes, including the failure of the system to reflect information that the technicians thought they had entered.

IAN LOGAN

Unocal's *Dalesandro greased the skids of a once clumsy and time-consuming testing process*

"It was kind of a pain," says Bill Torok, the senior technician who first used the system. Dalesandro agrees that it was more efficient but not good enough. "It had to make each step of the process easier in order to be adopted," he says.

Dalesandro developed an easier to use system using Borland International's Paradox database management system on a Novell, Inc. Netware LAN. The division abandoned the stickers. Instead, information that technicians entered into Paradox was printed on tags.

Further, identification numbers on the tags were replicated as bar codes. Paradox uploads the information to the mainframe twice a day, using a Novell Systems Network Architecture gateway and a program developed in-house with the Novell Applications Programmer Interface. Senior technicians can now enter data with an easy-to-use PC program rather than a mainframe application.

"One key to the efficiency of the new system is that we can carry information over from one tag to another," notes Steve Henderson, another senior technician. "Since each tag usually differs only marginally from the last, this is a big time-saver." Torok says he can make 50 tags, which used to take half an hour or more, in a few minutes.

Life has also become easier for others. When the sample bottle comes to the lab, Gaile David, the data entry clerk, scans the bar code instead of rekeying the identification number. "The bar codes are much faster and easier for me, and there's less chance for errors," David says.

There were still drawbacks to the system, which was completed in the middle of last year. Because of its location, the printer could not easily be attached to a server to be shared. It was attached to a workstation and could be used only from that workstation.

Lanspool, a printer-sharing program from Lan Systems, Inc. in New York, now lets Unocal attach the printer to a workstation rather than a server, yet share it over the LAN. The printer is attached to the same workstation that serves as a mainframe gateway for the purpose of uploading Paradox files.

In February, the automated sample tag application was being used to produce only 50 to 60 tags on an average day, out of a total of 700 or more tags for all units. The application is now working smoothly enough to allow technicians on all units to begin using it, Dalesandro says. ●

Hurwicz is president of the MTI Group, a data communications consulting firm in Nashville.

Lawrence Livermore takes on role of matchmaker to reluctant DEC, Apple

BY BARBARA SEHR

In the barren Nevada desert, at the U.S. Department of Energy's Atlas Laboratory, a unique system separates "noise" from the signals in camera images of a light source.

The camera images are transported by microwave to the University of California Lawrence Livermore National Laboratory in Livermore, Calif., several hundred miles away. At the laboratory, they are stored in a Digital Equipment Corp. VAX minicomputer connected to an Apple Computer, Inc. Macintosh. The image is then driven through third-party software to the Macintosh, where raw data is extracted and analyzed by the architects of the U.S. nuclear weapons program.

The link between the labs is the most unusual example of Macintosh-to-VAX connectivity at Lawrence Livermore, which is operated by the Department of Energy and staffed by the University of California.

More than a year after Apple and DEC announced plans to link their platforms, there has been little action between the two vendors. Lawrence Livermore has not received a comprehensive response from the vendors to its efforts to forge the links, according to Marianne Marino Pierce, vendor liaison for DEC products at the laboratory. Like other major users, the lab has been left to improvise with third-party products.

In addition to analyzing the camera images from Nevada, Lawrence Livermore has forged links betwen DEC and Macintosh systems to support applications ranging from sharing resources such as printers and plotters to archiving data from Macintosh hard disks on a VAX tape drive. One application uses a Macintosh to emulate a more expensive Tektronix, Inc. graphics terminal.

Lawrence Livermore is a melting pot of computing power, drawing on resources that include four Cray Research, Inc. supercomputers, several IBM mainframes, 1,000 VAX systems, thousands of IBM and compatible personal computers and 3,400 Macintoshes. "We are buying about 10 times as many Macintosh systems as PCs," notes Peggy Poggio, manager of small systems at the laboratory.

The attraction to the Macintosh may seem incongruous in such a labyrinth of high-tech. But the computer promoted as easy to use has attracted the interest of the highly skilled employees there. "Our engineers were fascinated early on," says George Pavel, manager of Labnet, Lawrence Livermore's proprietary network.

That appreciation has become a dedication to joining the Apple and DEC platforms — with or without the leadership of the hardware manufacturers.

The drive for connectivity actually began long before the formal engagement of the two architectures, and it may outpace the actualization of any union between them. It started with a simple premise — to have a microcomputer perform various tasks, Poggio says.

daily data integration.
Response: Balancing make-do third-party links while awaiting an effective response from the hardware manufacturers, DEC and Apple.

The offices of many laboratory engineers and research personnel are cluttered with computers and terminals. There may be a VAX terminal for access to a large database, a Macintosh for simple PC applications and a Sun Microsystems, Inc. workstation for demanding calculations or graphics-intensive work such as computer-aided design. Using a Macintosh to get to the VAX not only reduces costs and clutter but makes everyone's job easier, Poggio says.

While the notion is simple, using one machine for critical calculations, graphics design and database access has proven more complex in implementation.

About 60 Apple Localtalk networks allow Macintoshes to use a VAX as a server. All but a few of these networks tie into Labnet, which connects all of the laboratory's computing power. There are two separate Labnets — an open network that carries shared data and resources and a classified network that holds government secrets.

Third-party emulation

Lawrence Livermore is relying on two third-party emulation programs — Alisatalk from Alisa Systems, Inc. in Pasadena, Calif., and Pacerlink from Pacer Software, Inc. in La Jolla, Calif.

Under both packages, the VAX acts as a file server on the Localtalk network, and the Macintosh can access VAX files. Currently, these packages are the only resources available to employees who want DEC-Apple connectivity. "It doesn't really matter if connectivity is achieved by having the VAX see the Mac as just another Decnet node or if the Macintosh sees the VAX as a huge disk drive," Pavel says. "All we want is that they work together."

However, neither package is complete, according to lab officials. "We want to see improved performance from both Alisatalk and Pacerlink," Pierce says.

Pavel notes that Alisa has sacrificed some performance to adhere to standards of the two platforms. Pacer, on the other hand, pays less attention to standards while providing stronger performance.

Pierce says none of the divisions implementing the Mac-to-VAX link is completely satisfied with the performance of either third-party product. Ultimately, users in the divisions expect some joint effort from DEC and Apple. "I just don't think they know yet how far the companies are going to go," she says. •

ED KASHI

Vendor liaison Pierce *looks for link improvements*

Sehr is a free-lance writer based in Hayward, Calif.

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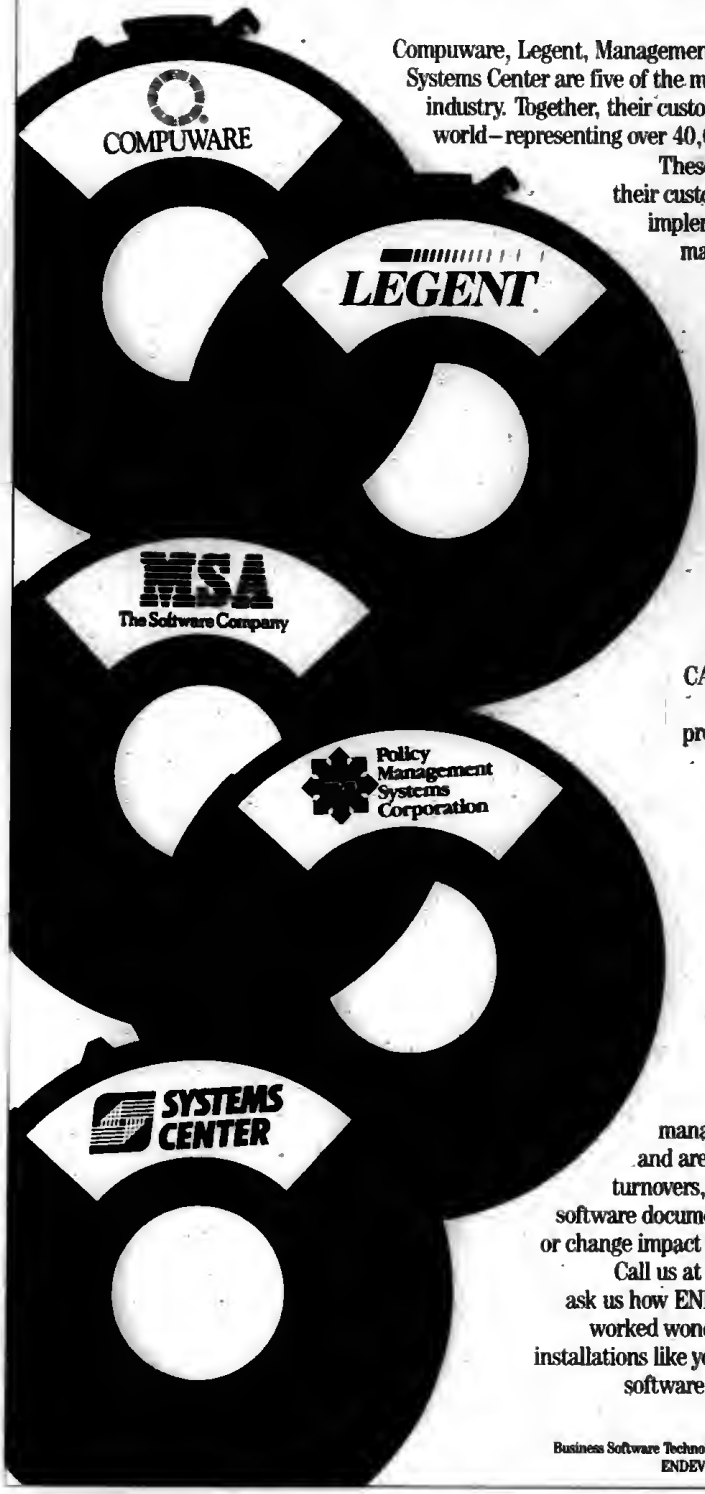

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IBM PCS AND COMPATIBLES

Finding the best rotation for PC lineup

BY JOHN J. XENAKIS

The "PC Shuffle" is a new dance that has been forced on corporate America during the past few years. As new computers come in through the door, something has to be done with the older machines, but figuring out exactly what can be a tricky maneuver.

What frequently happens is that the older machines are handed off to secretaries and other clerical personnel. Some organizations worry, however, about creating what amounts to a class system, based on computer capabilities.

That thought troubled Neal Hill, president of the Boston advertising agency Rossin, Greenberg, Seronick and Hill, when the firm purchased a number of IBM Personal System/2 micros to network with its IBM System/36. Hill and his partners wanted to find a use for their old XTs, but they did not, he says, "want to create a subclass of users."

A better alternative, Hill decided, was to create a subclass of machines, turning the old XTs into so-called "utility" machines.

"They're used for overflow computing," he explains. He put the old XTs in a back room and uses them as batch processors for monthly spreadsheet runs. "Once the programs are set up, it's the kind of activity that can be performed by an entry-level person. Also, one of the machines has a software program on it that I use only once a month. When I want to use it, I walk back there and use it."

Charles River Associates, a Boston consulting firm, came up with a similar idea when its XTs were replaced by new Intel Corp. 80386-based machines. One of the XTs was transferred to the night shift, running a complex econometric modeling application for one of the firm's clients in batch mode.

"We could run the application more quickly on a 386, but why bother?" says company President Gerald Kraft. "We just let it run all night and get the results in the morning. We don't need a 386 for that."

Ivan Brass, vice-president and director of information systems in the audit department at Manufacturers Hanover Trust Co. in New York, found another use for slightly dated personal computers. When a number of XTs and Intel 80286 machines were made obsolete by the purchase of several 386 models, Brass converted some of them into printer servers and communications gateways for the department's local-area network.

Recycling old PCs and XTs to act as batch processors, printer servers and communications gateways is not the norm. Most older computers don't fade away at all, but simply slide from desktop to desktop in an almost endless spiral.

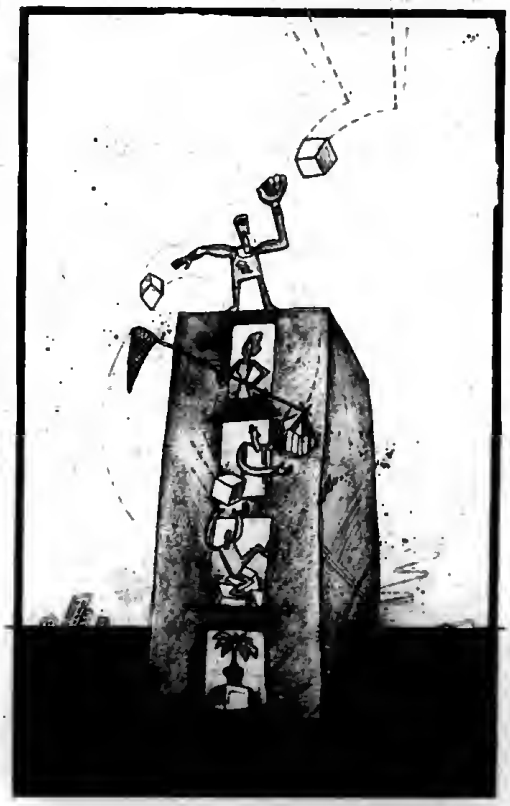
Kenneth Bosomworth, president of International Resource Development in Norwalk, Conn., points out that most firms have a large number of IBM PCs dating back to 1981 and Apple Computer, Inc. and Radio Shack machines dating back to 1977. IBM PCs of 1982-84 vintage are also in widespread use.

"What's happened," he explains, "is that [PCs] have been passed down from user to user. The enthusiastic power users, the individuals who have extensive requirements for spreadsheet computations or other functions for which speed is important, pass their older and slower machines along to others who use it for applications in which the speed requirements match the application. So the newer and faster equipment is being procured by the same people who got the PCs a few years ago and is being passed down to the secretaries, who don't care about the speed."

Bosomworth says he expects this pattern will quickly repeat itself when the Intel 80486 machines become available later this year. "Intel intends to fit the 486s in at the high end and entice the power- and the space-hungry user," he predicts.

You might think from Neal Hill's phrase, "subclass of user," that there is a potential for trouble, that the person who inherits an older machine might be jealous of the one getting a new 386 machine, but Robert Holmes, computer technology research analyst at the Southern California Gas Co. in Los Angeles, says that is not so.

"There isn't any squabbling because older machines that are replaced are moved to new locations in the company, and



DAVID POVILAITIS

Xenakis is software editor of *BCS Update*, the magazine of the Boston Computer Society.

INSIDE

Rotation

FROM PREVIOUS PAGE

they're used to fill outstanding requisitions," explains Holmes, whose firm has a current installed base of almost 2,000 PCs, two-thirds of which are PS/2s.

Pacificorp Financial Services in Portland, Ore., tries to practice frugality at both ends of the system life span. On the acquisition side, according to Robert F. Thrasher, Pacificorp's director of telecommunications, the company has begun buying Compaq Computer Corp. 386s without a hard drive and connecting them to a file server through a LAN.

When PCs reach the end of their useful life, Thrasher says, "We make them available to our internal employees to purchase for home use."

Selling used machines to employees is a nice idea, Kraft agrees, but "most of our employees already have machines at home that are better than the ones we're getting rid of," he says. "And, since we don't need any more doorstops," he adds, they will explore other options, such as donating the equipment to charity.

There are those who believe that the time has come for companies to stop leading PCs from desk to desk until they are so worn from the shuffle that they are only good for doorstops.

"My advice to clients is that they should look at workstations as a investment with a two-year writedown," says Art Caston, director of emerging technologies consulting at the DMR Group, Inc. in Toronto. He contends that companies cannot maintain a competitive advantage unless all their computers are on the leading edge. "If you leverage over a longer period, you're inhibiting the usability of the workstation to the end user."

Rossin Greenberg's Hill

To support this conclusion, Caston provides a complicated analysis of the technological capacity of workstations, which is his name for personal computers. He emphasizes the fact that workstations today have different uses than they did just a few years ago.

"The whole concept of a workstation has changed over three years," Caston says. "Now, I see its key area as achieving integration of different computer architectures and server platforms, structured databases, document management systems and messaging."

Such sophisticated functional integration cannot be achieved with XTs or ATs, which are not powerful enough, Caston says. For that reason, he adds, "We must convert our workstations to those that provide multiprocessing, sophisticated window management and common interfaces across platforms."

What does this mean for the user who simply wants to do some spreadsheet or word processing? "That's a reflection of the slowness of adopting true end-user computing," Caston explains. "If a workstation is being used [solely] for the occasional spreadsheet analysis, [the user] company is still in the early phases of computer technology. The user achieves a much higher degree of functionality through the PC than just spreadsheets. Those kinds of considerations will be driving them toward the more powerful and sophisticated workstations."

Caston maintains that users should look at the value of a computer to their organizations. If a more powerful computer saves several hours a day of a manager's time, then in today's competitive world, the cost of the more expensive computer will be small compared with its value.

"What it comes down to," he says, "is whether you're approaching your technology planning from a cost orientation or a value orientation."

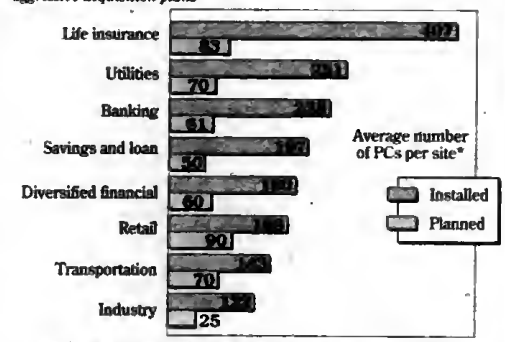
Many companies, however, are not buying the argument that there should be a 386-based machine on every desktop and are downright skeptical about anything beyond that.

"We have only one 386 in the

Continued on page 74

Conspicuous consumption?

Within the Fortune 1,000, life insurance companies average more PCs per site than any other industry group, and only retailers report more aggressive acquisition plans



* Sample includes Fortune 1,000 U.S. sites with more than 500 employees or with a minicomputer or mainframe

SOURCE: COMPUTER INTELLIGENCE — CW CHART: JOHN YORK

Gift PCs should keep on giving

If you don't feel like trying to resell aging PCs, charitable donation is another option. Be forewarned, however, most of your reward will come in the form of gratitude, and even that may be missing if the machines in question are extremely shopworn.

The tax savings are not very great in any case, says Susan Corrigan, senior vice-president of Gifts in Kind, Inc., an Alexandria, Va.-based organization that coordinates corporate donations of nonmonetary products to charity. The write-off is even less if the machines are obsolete, she adds.

The tax deduction is based on the depreciated value of the computer, she says, and "most companies keep their computers around so long that their value is practically nothing."

In cases like that, or instances in which the machines are very specialized, Corrigan adds, the gift may not even be very useful to the charity.

"There's nothing worse than a nonprofit organization receiving a computer they can't get parts for, or that is so special-purpose they can't even use it," she says.

For example, Corrigan says that she has declined offers of entire word processing systems because it was too costly to deinstall the systems and reinstall them elsewhere.

Not so picky

Not all charities are so stringent in their approach. The National Cristina Foundation, based in Pelham Manor, N.Y., will pay for shipping expenses if the donor insists, although it prefers that the corporation pay them as part of its donation. They will also prepare all the necessary tax donation paperwork.

"And if stuff is really wrecky," says Yvette Marin, the foundation's president, "we'll accept it for salvage purposes, and use the value of the parts for peripherals, adaptive devices, software."

To date, the foundation has distributed close to 3,000 computers, designated for all sorts of locations including schools, hospitals, rehabilitation centers and vocational training facilities.

If you are willing to donate equipment that is actually still useful, there are several other avenues available. In many cases, the most convenient method is to donate through the local United Way chapter.

Another way is to find a specific accredited charity that your organization would like to assist. The charity must be accredited for your company to receive any tax benefits.

Information about and lists of accredited charities can be obtained from either the National Charities Information Bureau in New York or the Philanthropic Advisory Service, a department of the Council of Better Business Bureaus in Arlington, Va.

Many states also keep lists of accredited charities. Practices vary from state to state, but if a referral service is available, it is usually part of the state attorney general's office.

JOHN XENAKIS

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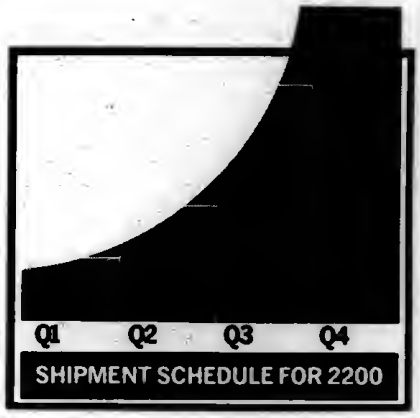

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Timing is key to good trade-in on old PCs

Kenny Rogers could have been singing directly to corporate PC purchasers when he cut his popular hit, "The Gambler." Knowing when to hold them and when to fold them can make a big difference in terms of both PC residual value and maintenance outlays.

Figuring out exactly when to sell is not necessarily easy. There is an optimal selling time for used computer equipment, and if you keep the equipment longer than that, it becomes technologically outdated and does not net as much money.

A recent example of how this works is last year's precipitous decline in resale value for IBM Personal Computer ATs.

"The AT was the premier IBM machine for several years, but in six months it lost nearly $800 of its value," says Alex Randall, president of the Boston Computer Exchange Corp., an organization that specializes in the sale of used computer equipment. What happened, he explains, was the laptop revolution.

"After six months, the first AT-compatible laptop came out," Randall says. "Then everybody and his brother introduced a laptop computer, and the desktop AT [market] began to fall apart."

All too often, corporations tend to hang on to computer equipment beyond its useful lifetime — and beyond its maximal dollar value. "They treat computers as lifetime purchases like houses, when they should be treating them as cars," Randall maintains.

Holding PCs for prolonged periods is not advisable, not only because of declining resale value but also because of escalating maintenance costs.

Like cars, computers tend to develop costly problems as they age. Furthermore, new models are, by and large, more easily maintainable. It costs about half as much to maintain a Personal System/2 Model 30 as it does to maintain a comparably equipped XT, and over a long period of time those expenses add up.

In most cases, explains John Ereckson, an analyst at market research firm Future Computing, Inc. in Dallas, organizations wind up paying third-party service providers to keep their old systems up and running.

That is not to say that firms should jump to trade at the first signal of change. Randall's rule of thumb is that the best time to consider such a move is after it has become obsolete for the second time.

The IBM PC came out in 1981, he points out. Managers should not have sold those machines when XTs came out. But when ATs arrived, he says, the writing was definitely on the wall: "After a machine has become obsolete for the third time, it goes into hopeless decline."

JOHN XENAKIS

Rotation

CONTINUED FROM PAGE 72

whole company," according to Ted Waltman, system vice-president at Resources Trust, a wholly owned subsidiary of Integrated Resources in Englewood, Colo., "and it's in the data processing department for development and graphics applications, where the speed makes the difference."

Waltman is well aware that many computer analysts are recommending that corporations purchase only 386 machines from now on. As far as he is concerned, the 286 machines are already far ahead, in terms of speed and capability, of most of the people using them. "My attitude — and the company policy — is to use what will be effective," he says.

If big power is needed, Waltman prefers to call in the really big guns. "If an application is so complex that it requires a 386, it ought to be run on the mini," he says. And that is just what he has done, putting the company's large database applications on an IBM Application System/400.

MH Trust's Brass

"From our perspective, this replaces the need for the 386s," Waltman says. "We're not creating a distributed environment in which users are responsible for their own data."

In fact, he adds, business managers do not want to be responsible for supporting applications and policing data integrity, which is why he gets no arguments about spending the money for a minicomputer.

Brass is somewhat more liberal in his attitude toward 386 machines. His department has bought approximately 60 386-based micros for spreadsheets and office applications and financial analysis.

But he did not put the 286-based computers that he could not use as servers and gateways out to pasture. Instead, he upgraded them with extended memory and, in some cases, Plus Development Corp.'s Hardcard add-in hard-disk card, before giving them to office personnel.

"We're going to continue to use our existing machines — I'm not sure that we have to go beyond the 386," Brass says. "I think there's going to be a point where you reach saturation. The human mind can only absorb so much. It's like going from 300 baud to 2,400 baud."

Gold Kist, Inc. in Atlanta is another company that has generally standardized on 286 machines.

According to T. Ray Lollar, vice-president of information services at the food manufacturer, 386s are used only for LANs and production-type applications.

Companies often dispense PCs and write standards for acquisition based on the type of software the user plans to run. But sometimes the user can employ the software in an unexpected way, and if care is not taken, the need for 386 machines can sneak up without him realizing it.

"We had a lot of people using Lotus' 1-2-3 for database applications in the beginning," says Steve Stuart, manager of end-user computing at Stone Container Corp. in Chicago. "When the database applications started taking too long, the users added Above Boards and memory, and by then, the cost ended up surpassing the price of a 386. So now we're moving people to R:Base or Dbase, and we're recommending a 386 machine." ■

Change of plans

As processors become more sophisticated, the role of PCs will also evolve, forcing companies to reevaluate their purchasing plans

Model	Best role	Strategic or tactical tool
80286 (12 MHz or less)	Low-use workstation	Tactical
80286 (More than 12 MHz)	Midrange workstation	Tactical
80386 SX	Midrange workstation	Both
80386	High-end workstation or server	Strategic
80486	Server	Strategic

SOURCE: INTERNATIONAL DATA CORP. CW CHART: JOHN YORK

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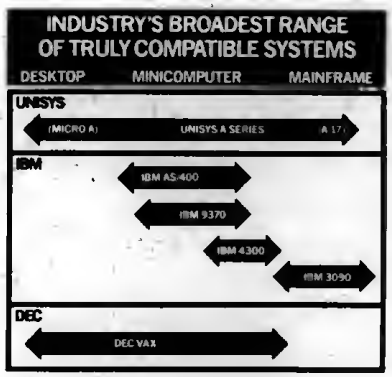

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Do corporate controls on PC purchasing work?

Figgie International, a diversified operating company headquartered in Willoughby, Ohio, is an example of an organization that tries to closely regulate the acquisition and configuration of personal computers.

"We set a procurement standard here starting in the early 1980s," says Walter J. Hayes, Figgie's director of MIS. He says that the corporate standard is IBM, but he provides a second choice for those divisions that are concerned about saving money.

"Our first choice is IBM, but our divisions have the latitude to choose Wyse, and they've been doing that because of the price difference," he explains.

Hayes also has a specific architectural standard. "On the business side, our standard is the 286 — that is not an option. Our primary applications have been for spreadsheets and financial analysis, and we have not seen the need for the power of a 386 for these applications," he says. Occasional exceptions are made, but only for users with engineering and design applications.

Not all corporations are as successful with central control of PC purchasing. Timothy A. Kenney, manager of information services at Systemetrics/McGraw-Hill, Inc., an operating company of New York-based McGraw-Hill, Inc. located in Santa Barbara, Calif., says that local standards supersede central ones.

"We're an operating company of McGraw-Hill, and they have a corporate policy that we're supposed to follow," Kenney says, "but we do things a little differently because we're really autonomous."

According to Kenney, both Systemetrics and McGraw-Hill have a policy of choosing IBM Personal Computers, but McGraw-Hill prefers Epson America, Inc. clones as a backup, a preference that Kenney does not share.

Kenney says Systemetrics often buys Compaq Computer Corp. units and recently acquired two Dell Computer Corp. machines for their speed. But he also favors a clone from Bentley Computer Products for its low price.

"They [McGraw-Hill] actually try to influence our purchasing by offering good rates through the McGraw-Hill bookstore in New York," Kenney says. "As a result, we can buy IBM and Epson machinery at a significant discount, but we still don't feel that gives us the best bang for the buck."

No support problem

Many corporate managers are concerned about support issues when a variety of different types of computers are involved, but Kenney has not found that to be a problem.

"We find that different clone makers now use fairly standard stock components," he says. "So I think reluctance to buy clones because of support problems is a moot issue. It's becoming like [buying] stereo equipment — at a certain level you almost can't buy something bad."

LIMITING support and training to products that adhere to standards can act as a rein on some users, but it is a limited control mechanism at best.

Thomas Cimino, senior vice-president of information services at the Great American Life Insurance Co. in Los Angeles agrees that corporate standards do not work very well.

The trouble, he says, is that most users have enough money to acquire what they want. The central organization can go ahead and create a standard, Cimino explains, "but then one user wants a board that costs only $100 or a $60 software package, and that's the end of the standard."

In terms of standards, Cimino adds, the only realistic and reasonable approach is to focus on protecting corporate data: "That should be our focus, rather than whether users are buying different word processors."

Loose rein

Limiting support and training to products that adhere to standards can act as a rein on some users, he points out, but it is a limited control mechanism at best.

"Frankly," he says, "if you don't need our support, you can do what you want to do. If you're content with that, good luck and adios."

James B. Grinham, MIS manager at Tremco, Inc., a subsidiary of B. F. Goodrich Co. in Cleveland, is more positive in his assessment of training and support as a means of encouraging standardization.

"We have not intentionally tried to control acquisition, but because we've been successful in how we advise people, including providing them with thorough training, every time someone needs a computer, they come to us." •

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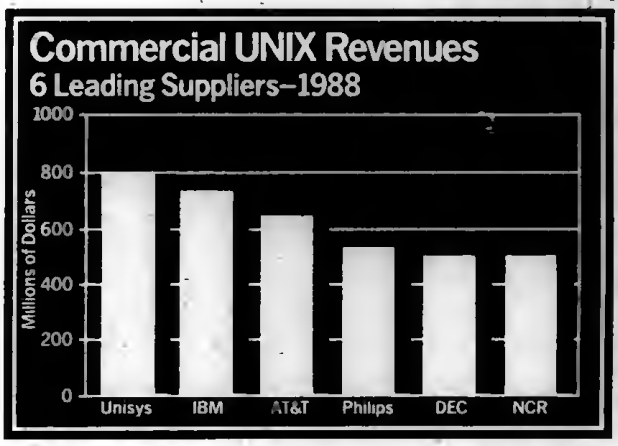

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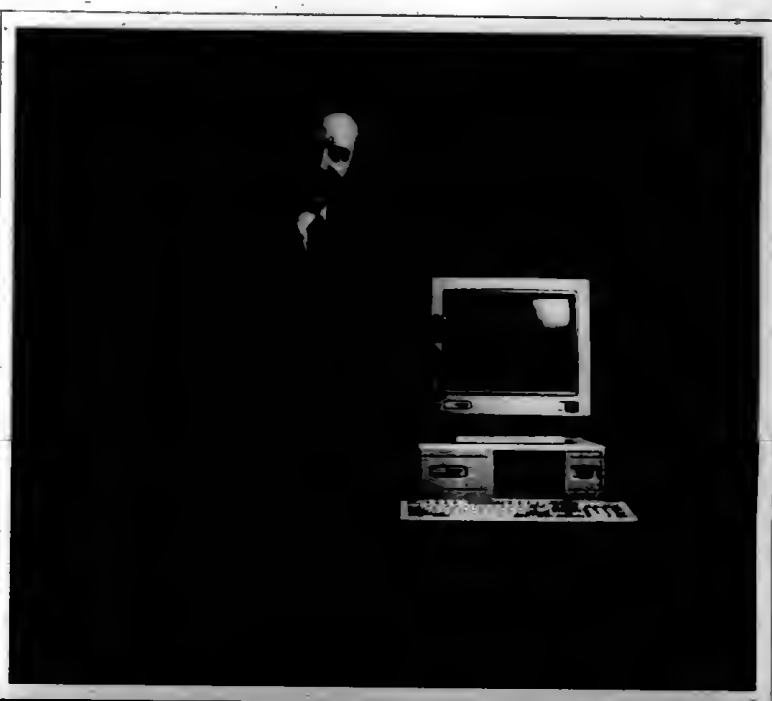
DISCLAIMER: System 316 is photographed with optional extras that some computer retailers won't even recognize.



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Gearing up for high-end needs

BY ANDREW TOPPER

Making the right match is critical when you want high-end personal computer products to support demanding applications such as computer-aided software engineering (CASE), computer-aided design and manufacturing (CAD/CAM) or local-area network file and SQL server use.

Because the CPU determines the amount of addressable memory and the relative speed of the machine, high-end uses typically require a fast (16- or 20-MHz) Intel Corp. 80286- or 80386-based computer. The Intel 80386SX chip offers an inexpensive alternative to 386-based computers as well as the 32-bit addressing that is missing from 286-based units.

The amount of random-access memory (RAM) needed for these applications often goes beyond the traditional 640K bytes available with DOS, and the hard disk requirements can far exceed the 40M-byte hard disk supplied with most 286-based machines. With memory prices declining, buying additional memory will soon become more feasible.

CASE tools that run on PCs or LANs are very resource-intensive because they use high-resolution graphics and provide a wide range of sophisticated development services.

Although CASE tools will usually run on standard IBM Personal Computers or PC XTs, those machines often cannot provide the level of response time needed to support an interactive development tool. In most instances, CASE tools are most effective when used on an 80386-based computer running at 20 MHz or higher.

CASE tools also usually require memory above the DOS 640K-byte mark for disk caching buffers, Lotus/Intel/Microsoft Extended Memory Specification and, in some cases, protected-mode operation.

Because most PC-based CASE tools use a central repository or data dictionary, the disk requirements are typically 20M bytes or more. The CASE repository contains all objects collected in the development effort, often resulting in dictionaries that are as large as 60M or 70M bytes. The majority of work involved in CASE products moves objects to and from the dictionary (and thus the hard disk). Therefore, a fast hard disk drive can make using the tool much more bearable.

The monitor and display adapter requirements for CASE tools range from IBM's Enhanced Graphics Adapter to Multisync and up. Most CASE tools include some form of diagraming aid such as data flow diagrams or decomposition diagrams, and these products generally use the graphical capabilities of the display adapter and monitor to their fullest.

IT IS MUCH easier to construct the right resource combination from the outset than to make enhancements later.

CAD/CAM software often requires the same resources as CASE tools, including high-resolution display adapters and monitors, a fast CPU and hard disk drives.

In some cases, CAD/CAM products can be used with large monitors — 19-in. and up — and display adapters that support very high resolutions — 1,024 by 1,024 pixels. Most of these products require a math coprocessor as well as a large, fast hard disk drive. External equipment usually includes a digitizer and an electrostatic plotter.

PCs used as LAN file servers and SQL servers provide multiuser access to databases and other shared resources via the network. This requires large, fast disk drives and vast amounts of memory for disk caching and network buffers. While it is possible for a PC equipped with 640K bytes of RAM under DOS to act as an SQL server, overall performance can be significantly improved with additional memory. PCs intended for use as file and SQL servers are typically optimized to make use of extended memory in PCs and sometimes to run operating systems such as Unix or OS/2 on 286 or 386-based computers.

Faster chip speeds, however, do not always mean faster response times for the database application. Sometimes increasing the speed of the hard disk and the data transfer speed can more directly affect overall response times.

The display adapter and monitor needed for file and SQL servers are usually only Hercules Computer Technology, Inc. or IBM's Color Graphics Adapter-based devices because these servers do not require graphics or high-resolution color displays. However, some network vendors do require that a special monitor and keyboard be attached to their file servers. Buyers should check with their network vendor before purchasing a monitor and display adapter.

When it comes to high-end uses for PCs, the best rule is to take a hard look at likely resource requirements prior to purchase. It is much easier to construct the right resource combination from the outset than to make enhancements later. •

Topper is president of Foresite Systems, a Lansing, Mich., consulting firm.

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Leery users take support tasks into their own hands

BY DANIEL GROSS

The uneducated enthusiasm that sold personal computers in the early 1980s is unacceptable to a new generation of users who know exactly what they want. More sophisticated than they were a decade ago, these users have grown wary and weary of the service and support promises made by PC manufacturers and value-added resellers (VAR).

Richard Kuiper, MIS director at Portland, Ore.-based Sulzer Bingham Pumps, Inc., says he finds untrained sales representatives, who pitch products without being aware of the products' technical capabilities, to be a hindrance. "You can wait forever for them to get the answers to your questions from the technical people behind the scenes," he explains.

Sometimes, the answer never comes because the person has left the company. "It seems like turnover is very high. You never talk to the same person twice," notes Robert Voltz, director of MIS at Rieke Corp., a South Bend, Ind.-based industrial manufacturing firm.

> "IT SEEMS LIKE the level of expertise is rather low in service and support. Half the time, I'm telling [manufacturers] what to do or how to do it."
>
> ROBERT VOLTZ
> RIEKE CORP.

As a result, neither PC vendors nor VARs have much of a reputation for real-world problem solving.

"We have circumvented most of the problems other companies have by finding a very good PC vendor," Kuiper says. "We pretty much sole-source all our PC needs through one [VAR]. But we did go through a number of bad situations [with VARs] before we found this one company," including a three-week siege with a Diablo Systems, Inc. printer that the salesman said was IBM-compatible.

"It seems like the level of expertise is rather low in service and support," Voltz notes. "Half the time, I'm telling [manufacturers] what to do or how to do it. Most of our PCs have come from a distributor" — a source that dispenses product without any service or support claims.

Frustrated users are fighting back by taking matters into their own hands. Users large and small have become less dependent on their suppliers' expertise, and many firms now run their own repair and maintenance centers.

"We're not getting that much support [from our supplier], and we're not really looking for it," says Allen Head, director of data processing at Indianapolis-based Universal Flavors, Inc. "Normally, we buy our PCs [IBM and clones] through Nynex Corp. We just order what we want; they deliver it. There's no sales strategy that goes on at all, which we appreciate because we don't like being sold [to]."

Kuiper's biggest problem before finding his current supplier — a VAR that is willing to navigate the maze of vendors and products for him — was the short-sighted focus of manufacturers' and other VARs' product announcements and sales pitches.

The big picture

"Each announcement was looked at as a thing in itself and not how it related to the whole picture," he explains. "If somebody was pitching a new networking module for a PC, they would usually not be sure how it would fit in with other networking standards, for instance. Will this PC or device fit into this network? Will it work with this printer? Will it support this modem? And the [VARs'] answer was always 'We're not sure, but by itself, this is the greatest thing since sliced bread,' " he says.

"I'd like to see faster delivery time on things such as memory boards. Last time I ordered an upgrade, it took months to get memory. That can be a serious problem when you're in a project environment," says Kenneth Platt, manager of information services at Bethlehem Steel in Bethlehem, Pa.

"We are developing a large project with [IBM's] Presentation Manager and OS/2," he explains. "We get the memory, but [getting it] is a problem. We have our own technical people repairing [the cards]."

Educated caution seems to be the mood among PC users in dealing with their suppliers these days. As Voltz explains, "I learned early on to take a hard look before I buy, so I haven't gotten severely burned." ●

Gross is chairman and co-founder of Magnetic Press, Inc. in New York.

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Laptops for sales support

BY STEPHEN SATCHELL and HEATHER CLIFFORD

Sales representatives need all their big guns close at hand. Laptop personal computers can provide them with easy access to the ammunition they need.

Savvy sales reps can benefit from laptops by making on-the-spot use of the same software that is running on their desktop systems in the home office. This is especially true for those reps selling customized, price-sensitive products and services to corporate markets.

A laptop PC for sales support use needs room for a hard disk drive to store data and programs, especially for graphics. This requirement eliminates virtually all of the low-end (under $2,000) systems, which have only one or two 720K-byte floppy drives. But it also needs to be light and compact enough for the salesman to carry inconspicuously into meetings, a feature found in most of the newer portables.

PRODUCT FACE-OFF

The main difference within this group is the power supply. Most, such as the Zenith Data Systems Supersport, can run on batteries — something no desktop computer was designed to do. But some, such as the Toshiba America, Inc. T-3100E, are solely AC-powered.

The Supersport and the T-3100E have much in common. Both systems do a fine job of letting two or three people see what is on the screen. Both allow you to send data via the video port to a separate IBM Color Graphics Adapter monitor. Each offers a 20M-byte hard disk for room to run even the most demanding applications. Further, both manufacturers recognize the importance of reliability, providing 24-hour repair/service programs.

The briefcase-size T-3100E is a complete IBM-compatible, Intel Corp. 80286-based system. Its 25-line, dot-based gas-plasma display does not distort or "squash" whatever is being displayed. Circles look like circles instead of eggs, and pie-charts look like, well, pies. Although the bright-orange-on-dark-orange display may sound like a less than ideal color combination, it has enough contrast to be easily readable from anywhere within a 120-degree angle in front.

AC-powered laptops such as the T-3100E are able to provide the power necessary for sharp and clear images. AC-powered displays also have a much wider effective viewing angle than battery-run units; in other words, users can read what is on the screen without having to be directly in front of it.

The $3,599 Zenith Supersport is roughly the same size and weight as the Toshiba T-3100E; it uses an 8-MHz Motorola, Inc. 80C88 processor. The Supersport provides AC power access as well as the aforementioned battery supply.

The T-3100E provides the power for sharp and clear images. . . . For the Supersport and other battery-run systems, freedom from the power cord comes at a cost.

For the Supersport and other battery-run systems, freedom from the power cord comes at a cost. To run efficiently on batteries, these laptop systems need to use as little power as possible. This means that their screens, whether gas-plasma or supertwist LCD, lack the sharpness or clarity of screens in desktop systems.

Instead of a power-hungry two-color gas-plasma display, the Supersport uses a backlit LCD screen. The 24-line display has three levels of blue characters and graphics on an off-white background, which provides a good contrast range. The dots that make up the characters take fractions of a second to change state, although this is noticeable only when you scroll quickly through text. Because the screen is not readable from a sideways angle, however, no more than two other people can watch over your shoulder.

As for batteries themselves, power technology is still at the point where users should think of their laptops' nickel cadmium batteries as insurance against data loss, instead of treating cordless computing as the system's main mode of operation. Even at full charge, the batteries in the most powerful laptop PCs only give you about two hours' worth of full-tilt cordless computing, despite manufacturers' claims. So carrying an extension cord and using AC power whenever possible is a wise safeguard.

For sales reps who find themselves in places where finding a power outlet is a problem, battery-powered laptop computers have the advantage of cordless operation. But for users who find themselves in boardrooms more often than on factory floors, AC-only laptops may offer an edge worth considering. •

Satchell helped found *Infoworld's* Test Center and has been writing product evaluations for 15 years. Clifford is the author of several computer books.

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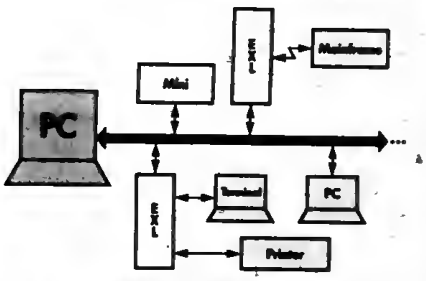

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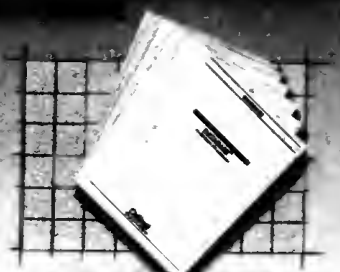

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Acer Technologies (408) 922-0333	Acer 1100/16	MS-DOS	4.8, 6.8 10, 12, 16	Yes	2-12	1.2-676	Two 8-bit, five 16-bit, one 32-bit	2	1	None	Desktop	21 x 16.4 x 6.5	51	Vendor, dealers, third parties	$3,195
	Acer 1100/20	MS-DOS	4.8, 6.8 10, 12, 20	Yes	2-12	1.2-676	Two 8-bit, five 16-bit, one 32-bit	2	1	None	Desktop	21 x 16.4 x 6.5	51	Vendor, dealers, third parties	$3,945
	Acer 1100/25	MS-DOS	6, 8, 25	Yes	2-24	1.2-676	One 8-bit, five 16-bit, one 32-bit, one 32/16-bit	2	1	None	Desktop	20.6 x 16.5 x 6.3	52	Vendor, dealers, third parties	$6,295
Advanced Computer Products, Inc. (714) 568-8813	Advanced 386	MS-DOS	16, 20, 25	No	1-4	85-380	Two 8-bit, five 16-bit, one 32-bit	1	1	None	Desktop, floorstanding	19 x 6.5 x 23.5	45	Dealers	$1,995-$4,995
Advanced Digital Corp. (714) 891-4594	Powerlite 386	MS-DOS	16	Yes	1-5	0-100M	Four 16-bit	1	1	VGA	Desktop	16 x 11.3 x 3.5	12	Vendor, dealers	$2,195-$4,295
Amdek Corp. (408) 922-5700	Amdek System 386E	MS-DOS	16	Yes	1-6	40-512	Two 8-bit, four 32/16-bit	2	1	None	Desktop	21.1 x 17.6 x 6.4	40	Vendor, dealers, third parties	$3,499-$4,299
American Mitac Corp. (800) 624-2287	Mitac Paragon 386C	MS-DOS	16	Yes	1-8	40-100	One 8-bit, four 16-bit	2	1	None	Desktop	14.8 x 16.5 x 6.2	NP	Dealers	$2,695-$5,038
	Mitac Paragon 386E	MS-DOS	20	Yes	1-8	40-100	One 8-bit, four 16-bit	2	1	None	Desktop	14.8 x 16.5 x 6.2	NP	Dealers	$2,695-$5,038
American Research Corp. (800) 433-3877	386 Skyscraper	MS-DOS	20	Yes	2-16	40-160	Two 8-bit, four 16-bit, two 32-bit	2	1	None	Desktop	NP	45	Vendor, dealers, third parties	NP
ASC Computer Systems (313) 779-8700	PC/386	MS-DOS, PC-DOS, Unix, Xenix	16, 20, 25	Yes	640K-16M	20-440	Four 8-bit, two 16-bit, two 32-bit	2	1	EGA, VGA, CGA	Desktop	17 x 7 x 14	30	Dealers, third parties	$2,000-$10,000
AST Research, Inc. (714) 863-1333	AST Premium Workstation/ 386SX	MS-DOS, Unix, Xenix	16	Yes	1-16	0-110	Two 8/16-bit	2	1	VGA, EGA, CGA	Desktop	16 x 14.6 x 3.4	NP	Dealers, third parties	$3,195-$5,195
	AST Premium 386/16	MS-DOS, Unix, Xenix	16	Yes	1-16	0-40	One 8-bit, five 16-bit, one 32 bit	1	1	None	Desktop	19.3 x 16.5 x 6.3	NP	Dealers, third parties	$3,295-$4,395
	AST Premium/386C	MS-DOS, Unix, Xenix	20	Yes	1-16	0-320	Two 8-bit, four 16-bit, one 32 bit	2	1	None	Desktop	19.3 x 16.5 x 6.3	NP	Dealers, third parties	$4,395-$9,785
	AST Premium 386/25	MS-DOS, Unix, Xenix	25	Yes	2-36	0-320	One 8-bit, three 16-bit, two 32-bit	2	1	None	Desktop	19.3 x 16.5 x 6.3	NP	Dealers, third parties	$6,595-$11,795
AT&T (800) 247-1212	AT&T 6386 Workgroup System	MS-DOS, Unix	16, 20	Yes	1-48	0-128	Three 32-bit, two 16-bit, two 8-bit	1	1	CGA, EGA	Desktop	19 x 16.7 x 7.3	NP	Vendor, dealers, third parties	$3,495-$6,895
Atronics International, Inc. (408) 943-3344	ATI-386 System/B	MS-DOS, PC-DOS	16, 20, 25	Yes	1-8	40-660	Three 8-bit, five 16-bit, one 32-bit	2	1	Optional	Desktop	21 x 16.5 x 6	32	Vendor, dealers	$2,500
Bull Worldwide Information Systems (617) 890-6000	SP	MS-DOS	16	Yes	2-16	44-640	Two 8-bit, six 16-bit	1	1	None	Desktop	21.2 x 16.5 x 6.1	40.7	Vendor	$4,700-$9,355
Canon USA, Inc. (516) 488-6700	Canon A-200SX Personal Computer	MS-DOS	16	No	1	1.2-40	Two 8-bit, five 16-bit, one 32-bit	2	1	EGA, CGA, MDA, MGA	Desktop	21 x 17 x 6.5	42	Vendor, dealers	$5,500-$6,480
CCI Computer Products (800) 331-8130	ST/300	MS-DOS	16, 20, 24	Yes	1-16	0-1.2G	Two 8-bit, five 16-bit, one 32/16 bit	Optional	Optional	None	Desktop	20.9 x 13 x 22.8	29	Vendor, third parties	$1,695-$7,000
Cheetah International, Inc. (800) 243-3824	Cheetah CAT 386	MS-DOS	40	Yes	1-16	65-383	Two 6-bit, six 16-bit	2	1	None	Desktop	NP	62	Vendor	$2,422-$15,924
Compaq Computer Corp. (713) 370-0670	Compaq Portable 386	MS-DOS	20	Yes	1-10	1.3-701.4	Two 8/16-bit	1	1	NP	Portable	16 x 7.8 x 9.8	21	Dealers	$7,999
	Compaq Deskpro 386/20	MS-DOS	20	Yes	1-16	1.3-901.4	One 8-bit, five 8/16-bit, one 32-bit	1	1	VGA	Desktop	14.1 x 16.5 x 6.4	27.5	Dealers	$8,299
	Compaq Deskpro 386/25e	MS-DOS	20	Yes	1-16	1.3-712.9	Four 8/16-bit, one 32-bit	1	1	VGA	Desktop	15.8 x 14.8 x 6.5	20	Dealers	$6,139
Compaudd Corp. (800) 627-1967	Compaudd 386/25	MS-DOS	25	Yes	1-16	40-320	One 8-bit, six 16-bit	2	1	None	Desktop	21.1 x 16.6 x 6.3	50	Third parties	$2,895-$6,146
	Compaudd 386/20	MS-DOS	20	Yes	1-16	40-320	One 8-bit, six 16-bit	2	1	None	Desktop	21.1 x 16.9 x 6.3	50	Third parties	$2,295-$5,549
	Compaudd 386/16	MS-DOS	16	Yes	1-16	40-320	Two 8-bit, five 16-bit	2	1	None	Desktop	21.1 x 16.6 x 6.2	50	Third parties	$1,895-$3,445
Computer Designed Systems, Inc. (512) 249-2000	Advisor Micro PC	MS-DOS, Unix	16, 20	Yes	640K-16M	30-600	Four 8-bit, eight 16-bit, four 32-bit	Up to 32	4	EGA, VGA	Desktop	17 x 14 x 12	32	Vendor	$2,600-$40,000
Cordata Technologies, Inc. (312) 603-2001	CS 5006B	MS-DOS	16	Yes	1-16	80	One 8-bit, five 16-bit	2	1	VGA, EGA, CGA, Hercules, Monochrome	Desktop	19.5 x 16.5 x 6	40.5	Third parties	$3,195-$5,595
	CS 5006B-2	MS-DOS	20	Yes	1-16	80	One 8-bit, five 16-bit	2	1	VGA, EGA, CGA, Hercules, Monochrome	Desktop	16.5 x 16.5 x 6	40.5	Third parties	$3,995-$6,395
Core International (407) 997-6000	Ascender 386	MS-DOS, Xenix, OS/2	20, 25	Yes	4-16	1.2	Two 8-bit, five 16-bit, one 32-bit	2	1	EGA, VGA, Monochrome	Desktop	21 x 17 x 6	30	Vendor, dealers, third parties	$4,495

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, the abbreviation NP (not provided) is used. When a question does not apply to a vendor's product, the abbreviation NA (not applicable) is used. Further product information is available from the vendors.

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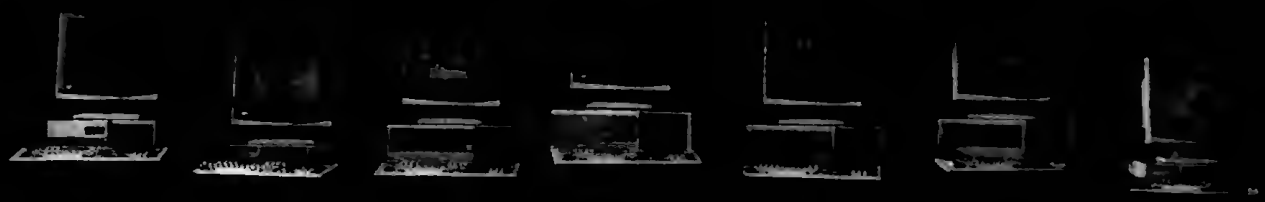

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AST Premium Workstation/286

AST Premium/286

AST Premium 386/25

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*Source: PC Week, Nov 14, 1988.

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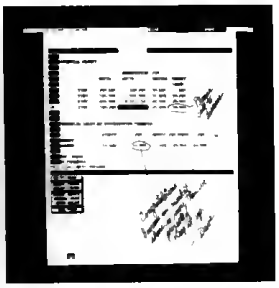

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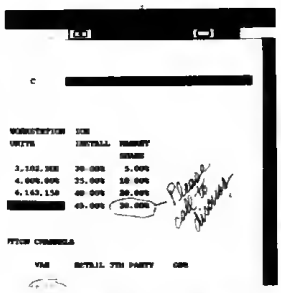

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The Freestyle system even lets you arrange and rearrange your Freestyle "desktop" exactly the way you would your own desk. Stack individual pages, staple them together, move them, spread them out or throw them away.

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Freestyle™ combines the speed of the personal computer with the simplicity of natural communications. It lets you communicate clearly and rapidly with your entire organization – on a personal level – without ever leaving your desk.

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Freestyle isn't a machine or another PC. It uses a personal computer, but you don't. It lets you add your own questions, comments and directives – written in your own hand and spoken with your own voice – to the Freestyle screen. Freestyle can be used with either scanned or FAXed information or information generated by any PC system.

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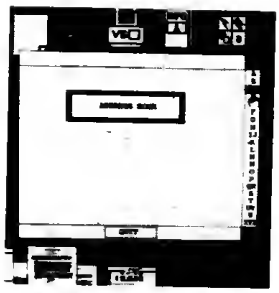

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COMPANY	PRODUCT	OPERATING SYSTEM	CLOCK SPEED (MHz)	SUPPORTS OS/2	RANDOM-ACCESS MEMORY (MEGABYTES)	STORAGE (MEGABYTES)	NUMBER AND TYPES OF EXPANSION SLOTS	NUMBER OF SERIAL PORTS	NUMBER OF PARALLEL PORTS	TYPE OF BUILT-IN GRAPHICS CAPABILITY	DESKTOP OR PORTABLE SYSTEM	FOOTPRINT (INCHES)	WEIGHT (LBS)	SERVICED BY	PRICE
Data Basic Computer, Inc. (415) 499-8000	DBC System 386SC	MS-DOS, PC-DOS, Xenix, Unix, MOS386	8, 8, 20	Yes	1-16	1-16	Two 8-bit, five 16-bit, one 32-bit	None	None	None	Desktop	21 x 19 x 6	48	Vendor, dealers	$1,625
	DBC System 386/20	MS-DOS, PC-DOS, Xenix, Unix, MOS386	8, 8, 20	Yes	1-20	0-660	Two 8-bit, five 16-bit, one 32-bit	None	None	None	Desktop	21 x 19 x 6	43	Vendor, dealers	$7,416
	DBC System 386/16	MS-DOS, PC-DOS, Xenix, Unix, MOS386	8, 8, 16	Yes	1-16	0-660	Two 8-bit, five 16-bit, one 32-bit	None	None	None	Desktop	21 x 16 x 6	48	Vendor, dealers	$1,290
	DBC System 386/25C	MS-DOS, PC-DOS, Xenix, Unix, MOS386	8, 8, 25	Yes	1-16	0-660	Two 8-bit, five 16-bit, one 32-bit	None	None	None	Desktop	21 x 19 x 6	45	Vendor, dealers	$2,730
Data General Corp. (800) 328-3436	Dasher/386	MS-DOS	16	No	1-16	40-70	Two 16/8-bit, three 32/16-bit	1	1	EGA	Desktop	21 x 15 x 8.3	41	Vendor	$5,525-$16,965
Datamedia Corp. (603) 889-1570	Netmate/XLS	MS-DOS	20	Yes	2-8	40-80	Three 16-bit, One 32-bit	1	1	VGA	Desktop	15.2 x 14.5 x 4.5	22	Third parties	$4,895-$13,370
Dell Computer Corp. (800) 426-5150	Dell System 316	MS-DOS	20	Yes	1-16	1.2-1.4	One 32-bit, six 16-bit, two 8-bit	2	1	VGA	Desktop	21.1 x 17.8 x 6.4	37	Third parties	$3,699-$7,299
	Dell System 325	MS-DOS	25	Yes	1-16	1.2-1.4	One 32-bit, six 16-bit, two 8-bit	2	1	VGA	Desktop	21.1 x 17.8 x 6.4	55	Third parties	$5,999-$8,899
Digital Equipment Corp. (800) 488-6111	Decstation 316 Personal Computer	MS-DOS	16	No	1-16	40-170	Two 8-bit, six 16-bit	1	1	VGA	Desktop	19 x 16 x 6.5	38	Vendor	$3,485 and up
	Decstation 320 Personal Computer	MS-DOS	20	No	1-16	40-170	Two 8-bit, six 16-bit	1	1	VGA	Desktop	19 x 19 x 6.5	38	Vendor	$4,960 and up
Dolch Computer Systems (408) 435-1881	Dolch P.A.C 386-25	MS-DOS, Unix, Xenix, Pick, Theos	25	Yes	4-8	40-170	One 6-bit, two 16-bit	1	1	CGA	Desktop	16 x 9.5 x 7.8	20	Vendor, dealers, third parties	$9,495-$13,980
	Dolch P.A.C 386-20	MS-DOS, Unix, Xenix, Pick, Theos, OS/2	20	Yes	4-8	20-170	Three 16-bit	1	1	CGA	Desktop	16 x 9.5 x 7.8	20	Vendor, dealers, third parties	$6,495-$13,980
Everex Computer Systems Division (800) 366-4300	Everex Step 386/25	MS-DOS, OS/2, Xenix	25	Yes	1-8	40-330	One 8-bit, six 16-bit, one 32/8-bit	1	1	None	Desktop	21.3 x 16.5 x 6	NP	Vendor, dealers	$4,999-$8,799
	Everex Step 386/20	MS-DOS, OS/2, Xenix	20	Yes	1-8	40-330	One 8-bit, six 16-bit, one 32/8-bit	1	1	None	Desktop	21.3 x 16.5 x 6	NP	Vendor, dealers	$4,199-$7,999
	Everex Step 386/16	MS-DOS, OS/2, Xenix	16	Yes	1-8	40-330	One 8-bit, six 16-bit	1	1	None	Desktop	21.3 x 16.5 x 6	NP	Vendor, dealers	$3,799-$7,599
	Everex Step 386/S	MS-DOS, OS/2, Xenix	16	Yes	1-4	40-330	One 8-bit, six 16-bit, one 32-bit	1	1	None	Desktop	21.3 x 16.5 x 6	NP	Vendor, dealers	$2,799-$3,899
Frontier Computers (214) 242-7000	Model 316	MS-DOS, OS/2	16	Yes	1-16	1.2-330	One 6-bit, six 16-bit, one 32-bit	1	1	NP	Desktop	NP	NP	Vendor	$1,695
	Model 320	MS-DOS, OS/2	20	Yes	1-16	1.2-330	One 8-bit, six 16-bit, one 32-bit	1	1	NP	Desktop	NP	NP	Vendor	$2,049
	Model 325	MS-DOS, OS/2	25	Yes	1-16	1.2-330	One 8-bit six 16-bit, one 32-bit	1	1	NP	Desktop	NP	NP	Vendor	$2,895
Fortron/Source Corp. (800) 821-0771	386-20 Plus	MS-DOS	20	Yes	1-16	40M-4G	One 8-bit, six 16-bit, one 32-bit	2	1	None	Desktop	20 x 16 x 7	40	Third parties	$2,600-$6,300
	386-20 Racer	MS-DOS	20	Yes	1-16	40M-4G	One 8-bit, six 16-bit, one 32-bit	2	1	None	Desktop	20 x 16 x 7	40	Third parties	$2,049-$5,600
Franklin Telecom/ Shamrock Computer (805) 373-0668	FTC 386 16/20	MS-DOS, Unix, Xenix, OS/2	16, 20	Yes	1-16	NP	Two 8-bit, five 16-bit, one 32-bit	1	1	None	Desktop	17.3 x 21.3 x 6.5	44	Vendor	$2,275-$2,750
GCH Systems, Inc. (415) 988-3400	Easy Data Model 320	MS-DOS, OS/2, Unix, Xenix	20	Yes	2-16	0-300	Two 6-bit, five 16-bit, one 8/16/32-bit	2	1	None	Desktop	21.5 x 17.8 x 7.8	40	Third parties	$2,749-$7,500
Grid Systems Corp. (415) 656-4700	Grid-Desk 386IS	MS-DOS, Unix, OS/2	20	Yes	2-16	NP	Two 8-bit, six 16-bit, one 32-bit	1	1	VGA, CGA, EGA	Desktop	19 x 16 x 6.5	47	Vendor	$4,200
	Grid-Desk 386MC	MS-DOS, Unix, OS/2	20	Yes	2-16	1.4-80	Three 16-bit, two 32-bit	1	1	VGA	Desktop	17 x 15.5 x 6.1	38	Vendor	$5,295-$7,195
	Gridcase 1535 EXP	MS-DOS, Unix	12.5	No	1-8	1.4-100	One 8-bit, one 16-bit	1	1	CGA	Portable	15 x 11.5 x 2.5	12-15	Vendor	6,695-$16,340
	Gridcase 1530	MS-DOS, Unix	12.5	No	1-8	1.4-100	None	1	1	CGA	Portable	15 x 11.5 x 2.3	12	Vendor	$4,695-$14,340
Harris Computer Corp. (212) 884-4141	Harris 386/25	MS-DOS, OS/2, Unix, Xenix	25	Yes	2-24	72M-1.2G	One 8-bit, five 16/8-bit, two 32/16-bit	2	1	None	Desktop	21.3 x 18.7 x 6.5	44	Vendor, third parties	$6,850-$31,800
Hewlett-Packard Co. (800) 752-0900	HP Vectra QS/20PC	MS-DOS, OS/2, Xenix	20	Yes	1-16	40-310	One 6-bit, six 16-bit	1	1	VGA	Desktop	16.7 x 15.4 x 6.3	NP	Vendor, dealers	$4,495-$5,995
	HP Vectra QS/16	MS-DOS, OS/2, Xenix	16	Yes	1-16	40-310	One 6-bit, six 16-bit	1	1	VGA	Desktop	16.7 x 15.4 x 6.3	33	Vendor, dealers	$3,995-$5,495
	HP Vectra RS/20C	MS-DOS, OS/2, Xenix	20	Yes	1-16	103-155	Two 8-bit, six 16-bit	1-	1	None	Desktop	8.3 x 20 x 24	60	Vendor, dealers	$7,595-$10,145
	HP Vectra RS/25C	MS-DOS, OS/2, Xenix	25	Yes	1-16	103-155	Two 8-bit, six 16-bit	1	1	None	Desktop	8.3 x 30 x 24	60	Vendor, dealers	$10,295-$15,695
IBM (800) 426-3409	IBM PS/2 Model 80-311	MS-DOS, OS/2	20	Yes	2-20	314-628	Four 16-bit, three 32/16-bit	1	1	VGA	Floorstanding	23.5 x 6.5 x 19	52	Vendor, dealers	$11,995
	IBM PS/2 Model 80-111	MS-DOS, OS/2, AIX	20	Yes	2-19	115-420	Four 16-bit, three 32/16-bit	1	1	VGA	Floorstanding	23.5 x 6.5 x 19	52	Vendor, dealers	$8,595
	IBM PS/2 Model 80-041	MS-DOS, OS/2, AIX	20	Yes	2-20	70-384	Four 16-bit, three 32/16-bit	1	1	VGA	Floorstanding	23.5 x 6.5 x 19	52	Vendor, dealers	$7,595
	IBM PS/2 Model 80-071	MS-DOS, OS/2, AIX	20	Yes	2-20	70-384	Four 16-bit, three 32/16-bit	1	1	VGA	Floorstanding	23.5 x 6.5 x 19	52	Vendor, dealers	$7,995
	IBM PS/2 Model 70-A21	MS-DOS, OS/2, AIX	25	Yes	2-16	120	One 16-bit, two 32/16-bit	1	1	VGA	Desktop	6.5 x 14.3 x 14.3	21	Vendor, dealers	$11,295
	IBM PS/2 Model 70-121	MS-DOS, OS/2, AIX	20	Yes	2-16	120	One 16-bit, two 32/16-bit	1	1	VGA	Desktop	6.5 x 14.3 x 14.3	21	Vendor, dealers	$7,595
	IBM PS/2 Model 70-B61	MS-DOS, OS/2, AIX	20	Yes	1-20	60	One 16-bit, two 32/16-bit	1	1	VGA	Desktop	6.5 x 14.3 x 14.3	21	Vendor, dealers	$5,995
Innovation Computer Corp. (414) 693-3416	Innovation 3030 Tower	MS-DOS, Unix	16, 20	Yes	1-16	40-300	Three 8-bit, five 16-bit	2	1	CGA, EGA, VGA, Monochrome	Desktop	25.5 x 18.6 x 9.5	40	Vendor, dealers, third parties	$5,436-$6,217

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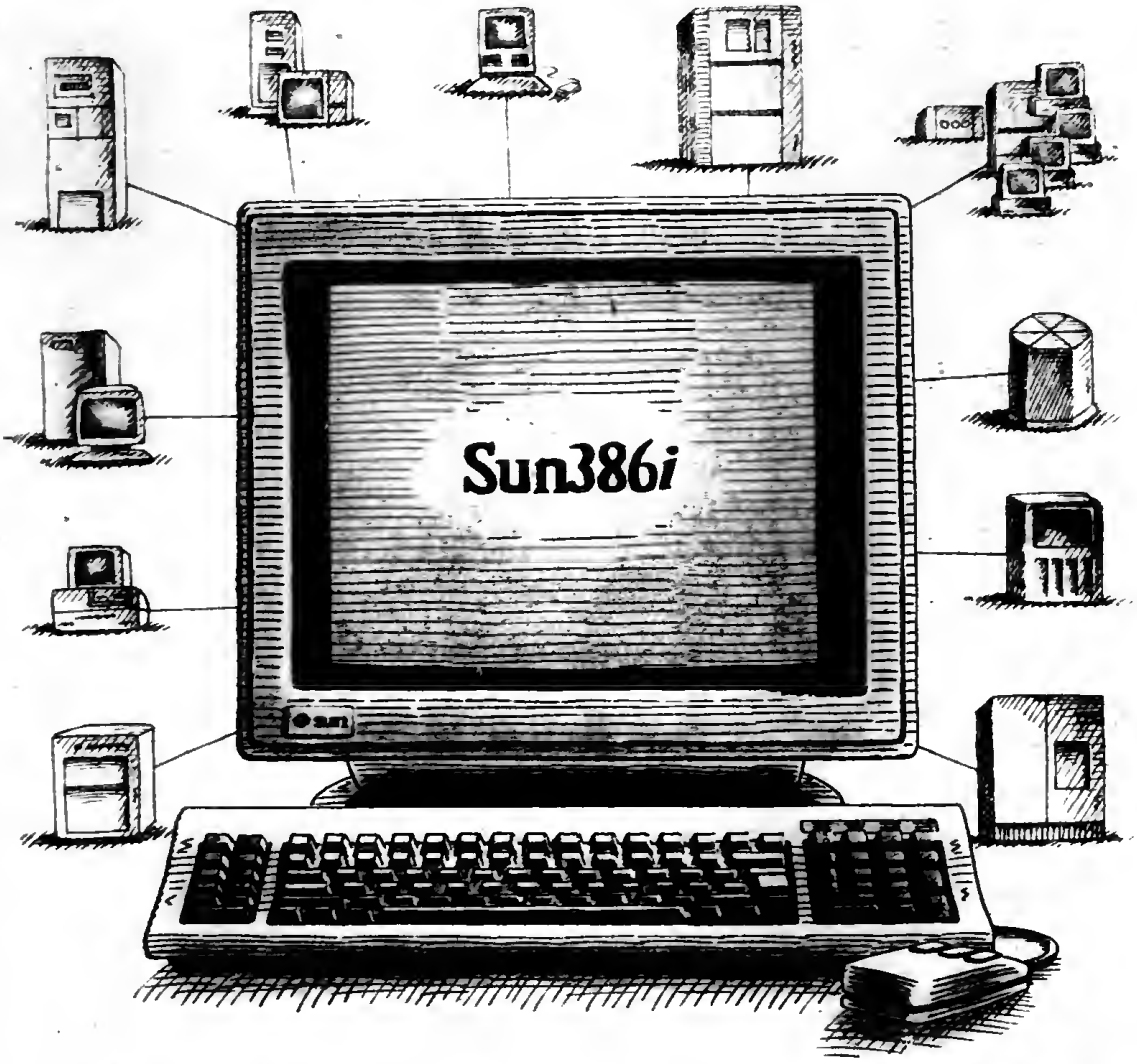

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COMPANY	PRODUCT	OPERATING SYSTEM	CLOCK SPEED (MHz)	SUPPORTS OS/2	RANDOM-ACCESS MEMORY (MEGABYTES)	STORAGE (MEGABYTES)	NUMBER AND TYPES OF EXPANSION SLOTS	NUMBER OF SERIAL PORTS	NUMBER OF PARALLEL PORTS	TYPE OF BUILT-IN GRAPHICS CAPABILITY	DESKTOP OR PORTABLE SYSTEM	FOOTPRINT (INCHES)	WEIGHT (LBS)	SERVICED BY	PRICE
Intech Systems, Inc. (408) 743-4300	**Model 5320 Power Server**	**MS-DOS**	**20**	**Yes**	**1-16**	**NP**	**Four 8-bit, five 16-bit three 32/16-bit**	**2**	**1**	**None**	**Desktop**	**21.3 x 17.3 x 6.8**	**42**	**Dealers**	**NP**
Intelligent Data Systems, Inc. (800) 325-3455	PC-386S-20	MS-DOS, Xenix	9, 20	Yes	1-16	40-180	Four 8-bit Three 16-bit one 32-bit	2	1	VGA, EGA, CGA, Monochrome, Hercules	Desktop	NP	65	Vendor	$2 999-$4,999
IBM, Inc. (301) 670-1823	Express 386/VGA-25	MS-DOS	25	Yes	1-16	40-320	Three 8-bit, four 16-bit	1	1	VGA	Portable	16.9 x 17.3 x 8.2	36	Vendor	$7,495
	Express 386/VGA-20	MS-DOS	20	Yes	1-20	40-320	Three 8-bit, four 16-bit	1	1	VGA	Portable	16.9 x 17.3 x 8.2	36	Vendor	$6,095
	Express 386/VGA-16	MS-DOS	20	Yes	1-16	40-320	Three 8-bit, four 16-bit	1	1	VGA	Portable	16.9 x 17.3 x 8.2	36	Vendor	$5,495
	Express 386/EGA-20	MS-DOS	20	Yes	1-16	40-320	Three 8-bit, four 16-bit	1	1	EGA	Portable	16.9 x 17.3 x 8.2	36	Vendor	$4,495
	Express 386/EGA-16	MS-DOS	20	Yes	1-20	40-320	Three 8-bit, four 16-bit	1	1	EGA	Portable	16.8 x 17.3 x 8.2	36	Vendor	$3,995
Keypro Corp. (619) 481-4300	K386A/20	MS-DOS	20, 25	Yes	1-16	1.2	Five 8/16-bit	1	1	None	Desktop	21.3 x 17 x 6.4	38	Dealers, third parties	$4,525-$6,895
	K386E/20	MS-DOS	20, 25	Yes	1-16	1.2	Five 8/16-bit	1	1	None	Desktop	21.3 x 17 x 6.4	38	Dealers, third parties	$4,525-$6,895
	K386-E/25	MS-DOS	20, 25	Yes	1-16	1.2-70	Five 8/18-bit	1	1	None	Desktop	21.3 x 17 x 6.4	38	Dealers, third parties	$4,525-$6,895
Lazer Digital, Inc. (800) 826-4288	**Power 386**	**MS-DOS**	**20**	**Yes**	**2-20**	**40-300**	**Two 8-bit, five 16-bit, one 32-bit**	**2**	**1**	**VGA**	**Desktop**	**NP**	**NP**	**Vendor**	**$1,533-$2,683**
Micro Express (714) 662-1973	ME 386-25	MS-DOS, PC-DOS	25	Yes	4-16	630	One 32 bit, five 16-bit, two 8-bit	1	1	Monochrome, CGA, EGA or VGA	Desktop	21 x 16.5 x 5.5	NP	NP	$3,999
	Regal II	MS-DOS, PC-DOS	20	Yes	1-8	40-100	One 16-bit	1	1	Hercules-type monochrome, CGA or EGA	Portable	16 x 7.5 x 9	20	Vendor	$3,799
	ME 386-20	MS-DOS, PC-DOS	20	Yes	1-16	40-630	One 32-bit, five 16-bit, two 8-bit	1	1	Monochrome, CGA, EGA or VGA	Desktop	21 x 16.5 x 5.5	NP	NP	$2,650
Mitsubishi Electronics America, Inc. (213) 515-3993	**Mitsubishi MP 386 Desktop**	**MS-DOS**	**16**	**No**	**1-4**	**1.2-10**	**Two 8-bit, six 16-bit, two 32/16/8-bit**	**2**	**1**	**EGA, VGA**	**Desktop**	**22.5 x 16.8 x 6.4**	**44**	**Third parties**	**$3,995-$6,795**
NCR Corp. (800) 544-3333	NCR PC916	MS-DOS, OS/2	16	Yes	2-8	30-115	Two 8-bit six 16-bit	1	1	EGA	Desktop	6.2 x 21.1 x 16.5	40	Vendor, third parties	$4,495-$7,395
	NCR PC920ST	MS-DOS, OS/2	16	Yes	1-16	44-115	Two 8-bit six 16-bit	1	1	EGA	Desktop	13.6 x 28 x 25.3	40	Vendor, dealers	$4,495-$4,395
NEC Information Systems, Inc. (800) 284-6888	**Powermate 386/20**	**MS-DOS**	**8, 20**	**Yes**	**2-16**	**42-800**	**Two 8-bit, five 16/8-bit, one 32-bit**	**2**	**1**	**None**	**Desktop**	**21.2 x 16.5 x 6.3**	**61**	**Dealers**	**$4,095-$8,995**
Nixdorf Computer Corp. (617) 890-3600	Targon 386	Xenix	-	Yes	2-16	40-360	Two 8-bit, four 16-bit	2	1	MDA, CGA, EGA, Hercules	Desktop	21.1 x 16.8 x 6.3	45.3	Vendor	$5,855-$15,565
Ogivar Technologies (800) 361-3004	**Ogivar System SX386**	**MS-DOS, OS/2**	**16**	**Yes**	**1-16**	**40-100**	**Two 8-bit, five 16-bit**	**1**	**1**	**VGA**	**Desktop**	**7.6 x 20 x 14**	**32**	**Third parties**	**$3,200**
Olivetti USA (201) 526-8300	X386 XP1	MS-DOS	20	NP	1-48	80	Two 8-bit, two 16-bit, three 32-bit	1	1	VGA	Desktop	NP	NP	NP	$6,995
	M380 XP5	MS-DOS	20	NP	2-40	135	Two 8-bit, two 16-bit, three 32-bit	1	1	VGA	Desktop	NP	NP	NP	$8,375
	M380 XP5	MS-DOS	20	NP	4-64	135	Two 8-bit, four 16-bit, four 32-bit	1	1	VGA	Floorstanding	NP	NP	NP	$11,100
	M380 XP7	MS-DOS	25	NP	4-64	56	Two 8-bit, four 16-bit, four 32-bit	1	1	VGA	Floorstanding	NP	NP	NP	NP
Packard Bell (818) 773-4000	**PB300/16**	**MS-DOS**	**16**	**Yes**	**1-20**	**1.2-300**	**Two 8-bit, six 16-bit**	**2**	**1**	**None**	**Desktop**	**21.1 x 17.3 x 6.6**	**NP**	**Vendor, dealers, third parties**	**$4,799**
	PB300/20	**MS-DOS**	**20**	**Yes**	**1-20**	**1.2-300**	**Two 8-bit, six 16-bit**	**2**	**1**	**None**	**Desktop**	**21.1 x 17.2 x 6.3**	**NP**	**Vendor, dealers, third parties**	**$4,799**
	PB300/20TR	**MS-DOS**	**20**	**Yes**	**1-16**	**1.2-300**	**Two 8-bit, six 16-bit**	**2**	**1**	**None**	**Floorstanding**	**7.5 x 18 x 25**	**NP**	**Vendor, dealers, third parties**	**$3,795**
	PB300/20TR	**MS-DOS**	**20**	**Yes**	**1-16**	**1.2-300**	**Two 8-bit, six 16-bit**	**2**	**1**	**None**	**Floorstanding**	**7.5 x 18 x 20**	**NP**	**Vendor, dealers, third parties**	**$2,795**
PC Craft, Inc. (714) 258-8000	PCC 2300/20	MS-DOS, Xenix	16, 20	NP	1-16	1.2 760	Two 8-bit, five 16-bit, one 32-bit	1	1	None	Desktop	20.75 x 16.5 x 6	35	Vendor, third parties	$2,930
	PCC 3400/20FB	MS-DOS, Xenix	16, 20	NP	1-16	1.2	Two 8-bit, five 16-bit, one 32 bit	1	1	None	Floorstanding	NP	NP	Vendor, third parties	$4,025
	PCC 3500/25FB	MS-DOS, Xenix	25	NP	1-16	1.2	Two 8-bit, five 16-bit, one 32-bit	1	1	None	Floorstanding	NP	NP	Vendor, third parties	$5,840
Peak Microsystems (619) 536-2881	**Acer 1100**	**MS-DOS**	**20, 25**	**Yes**	**2-20**	**60-330**	**Two 8-bit, five 16-bit, one 32-bit**	**2**	**1**	**None**	**Desktop**	**21 x 16.4 x 6.5**	**51**	**Dealers, third parties**	**$6,700-$11,500**
Profit Technology, Inc. (800) 223-4628	Pro/One Model 75	MS-DOS	20	Yes	1-24	80-380	Two 8-bit, five 16-bit	1	1	MGA, CGA, EGA, VGA	Desktop	16.4 x 16.8 x 17	21	Third parties	$3,995-$11,895
Proteus Technology Corp. (800) 722-6887	**Proteus 386/25**	**MS-DOS**	**8, 25**	**Yes**	**1-20**	**40-760**	**Two 8-bit, six 16-bit, one 32-bit**	**2**	**1**	**Monochrome, VGA**	**Desktop**	**21.3 x 17.2 x 6.8**	**49**	**Third parties**	**$4,691-$8,396**
	Proteus 386/20	**MS-DOS**	**8, 20**	**Yes**	**1-16**	**40-760**	**One 8-bit, six 16-bit, one 32-bit**	**2**	**1**	**Monochrome, VGA**	**Desktop**	**21.3 x 17.2 x 6.8**	**49**	**Third parties**	**$3,565-$6,895**
	Proteus 386/16	**MS-DOS**	**8, 16**	**Yes**	**1-16**	**40-760**	**One 8-bit, six 16-bit, one 32-bit**	**2**	**1**	**Monochrome, VGA**	**Desktop**	**21.3 x 17.3 x 6.8**	**49**	**Third parties**	**$2,847-$6,006**
Rite Computer (818) 284-6897	SDI 386/16	MS-DOS	16	Yes	1-16	40-320	Two 8-bit, five 16-bit, one 32 bit	2	1	EGA	Desktop	21 x 16.5 x 5.75	42	Vendor	$2,199-$7,799

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COMPANY	PRODUCT	OPERATING SYSTEM	CLOCK SPEED (MHz)	SUPPORTS OS/2	RANDOM-ACCESS MEMORY (MEGABYTES)	STORAGE (MEGABYTES)	NUMBER AND TYPES OF EXPANSION SLOTS	NUMBER OF SERIAL PORTS	NUMBER OF PARALLEL PORTS	TYPE OF BUILT-IN GRAPHICS CAPABILITY	DESKTOP OR PORTABLE SYSTEM	FOOTPRINT (INCHES)	WEIGHT (LBS)	SERVICED BY	PRICE
Burgo Business Systems Corp. (201) 440-0000	MBC 16 Plus	MS-DOS	16	NP	1-15	0-50	Two 8-bit, four 16-bit, one 32-bit	1	1	None	Desktop	13.8 x 16.1 x 6.6	36	Dealers	$3,490-$4,472
SCI Technology (205) 882-4533	SCI 300	MS-DOS, Xenix	18	Yes	2-16	40-170	Five 16-bit	2	1	CGA, EGA	Desktop	21 x 16.5 x 6.3	47.5	Vendor	$3,054-$8,519
	SCI 301	MS-DOS, Xenix	20	Yes	2-16	40-170	Five 16-bit	2	1	CGA, EGA	Desktop	21 x 16.5 x 6.3	47.5	Vendor	$3,146-$9,331
	SCI 302	MS-DOS, Xenix	16	NP	2-16	40-700	Seven 16-bit	2	1	CGA, EGA, VGA	Desktop	17 x 16.5 x 6.3	45.5	Vendor	$2,778-$9,767
	SCI 303	MS-DOS, Xenix	20	Yes	2-16	40-700	Seven 16-bit	2	1	NP	Desktop	17 x 16.3 x 6.3	45.5	Vendor	$2,858-$10,567
	SCI 304	MS-DOS, Xenix	25	Yes	2-16	40-700	Seven 16-bit	2	1	NP	Desktop	21 x 16.3 x 6.3	47.5	Vendor	$3,308-$11,017
SDC, Inc. (410) 687-0007	5386-2100A	MS-DOS, PC-DOS, Unix Xenix, OS/2	20	Yes	1-16	None	Two 6-bit, five 16-bit, one 32-bit	2	1	None	Desktop	21 x 16.5 x 6.3	50	Dealers	$2,179
Sun Microsystems, Inc. (415) 960-1300	Sun3/60/150	MS-DOS, Sun OS	20	No	4-16	91-155	One 8-bit, three 16-bit, four 32-bit	1	1	NP	Desktop	7.5 x 20.5 x 16	49	Vendor	$11,490-$16,990
Tandon Computer Corp. (800) 223-6340	Tandon 304/16 Model 1	MS-DOS, MS-Windows	16	Yes	1-8	1.2	Two 6-bit, six 16-bit	1	1	None	Desktop	21.1 x 16.3 x 6.3	NP	Dealers	$3,999
	Tandon 304/16 Model 40	MS-DOS, MS-Windows	16	Yes	1-8	40	Two 8-bit, six 16-bit	1	1	None	Desktop	21.1 x 16.3 x 6.3	NP	Dealers	$4,999
	Tandon 304/20 Model 1	MS-DOS, MS-Windows	20	Yes	1-8	1.2	Two 8-bit, six 16-bit	1	1	None	Desktop	21.1 x 16.3 x 6.3	NP	Dealers	$4,999
	Tandon 306/20 Model 40	MS-DOS, MS-Windows	36	Yes	1-8	40	Two 8-bit, six 16-bit	1	1	None	Desktop	21.1 x 16.3 x 6.3	NP	Dealers	$5,999
	Tandon 306/20 Model 110	MS-DOS, MS-Windows	20	Yes	1-8	116	Two 6-bit, six 16-bit	1	1	None	Desktop	21.1 x 16.3 x 6.3	NP	Dealers	$7,999
	Tandon 306/20 Model 110DP	MS-DOS, MS-Windows	20	Yes	1-8	110	Two 6-bit, six 16-bit	1	1	None	Desktop	21.1 x 16.3 x 6.3	NP	Dealers	$8,499
Tandy Corp./ Radio Shack (817) 390-3011	Tandy 5000 MC	MS-DOS, OS/2, Xenix	20	Yes	2-16	Optional	Three 16-bit, two 32-bit	1	1	VGA	Desktop	17 x 15.5 x 6.3	38	Vendor	$4,999
	Tandy 4000 LX	MS-DOS, OS/2, Xenix	20	Yes	2-16	Optional	Two 6-bit, six 16-bit, one 32-bit	1	1	None	Desktop	19 x 18 x 6.5	45	Vendor	$3,999
	Tandy 4000	MS-DOS, OS/2, Xenix	16	Yes	1-16	Optional	Two 8-bit, six 16-bit, one 32-bit	1	1	None	Desktop	19 x 16 x 6.5	45	Vendor	$2,599
Tatung Company of America (213) 979-7955	TCS-6600	MS-DOS, Xenix, OS/2	25	Yes	2-16	NP	Two 6-bit, six 16-bit	2	1	Optional	Floorstanding	6.4 x 17.3 x 21.3	NP	Dealers	$4,565
Third Coast Technologies, Inc. (415) 570-4641	EL 386	MS-DOS, Xenix, Unix Theos, Pick	16, 20	Yes	1-8	30-765	Two 6-bit, five 16-bit, one 32-bit	Up to 16	1	MGA	Desktop	21 x 16 x 6.3	25	Vendor, third parties	$3,250
Toshiba America, Inc., Information Systems Division (714) 583-3000	T5200	MS-DOS	20	Yes	2-8	40-100	One 16-bit, one 6-bit	2	1	VGA	Portable	14.6 x 15.6 x 3.9	18.7	Vendor, dealers, third parties	$9,490, $10,999
	T5100	MS-DOS	16	Yes	2-4	40	One Toshiba slot	1	1	EGA	Portable	12.2 x 14.2 x 3.5	14.8	Vendor, dealers, third parties	$7,199
Trillian Computer Corp. (800) 338-8386	Trillian 386/20	MS-DOS	20	Yes	1-16	70M-1.5G	Two 8-bit, five 16-bit, one 32-bit	2	1	Monochrome, VGA	Floorstanding	7.5 x 17 x 24	45	Vendor, dealers	$1,795-$11,395
	Trillian 386/25	MS-DOS	25	Yes	1-16	70M-1.5G	Two 6-bit, five 16-bit, one 32-bit	2	1	Monochrome, VGA	Floorstanding	7.5 x 17 x 24	45	Vendor, dealers	$1,795-$11,395
Unisys Corp. (215) 542-5000	PW2 800/25A	MS-DOS, Xenix, OS/2	25	Yes	2-16	80-320	One 6-bit, five 8/16-bit, two 8/16/32-bit	2	1	VGA, EGA, monochrome	Desktop	21.3 x 18.7 x 6.5	47	Vendor, dealers, third parties	$8,845-$12,215
	PW2 800/16	MS-DOS, Xenix, OS/2	16	Yes	1-16	40-116	One 6-bit, four 16-bit, one 32-bit	2	1	VGA, EGA, monochrome	Desktop	21 x 17 x 6.5	48	Vendor, dealers, third parties	$5,985-$8,765
	PW2 800/20	MS-DOS, Xenix, OS/2	20	Yes	1-16	40-320	One 6-bit, four 16-bit, one 32-bit	2	1	VGA, EGA, monochrome	Desktop	21 x 17 x 6.5	48	Vendor, dealers, third parties	$5,860-$9,580
Wang Microsystems, Division of Wang Laboratories, Inc. (800) 962-6727	PC 386	MS-DOS	20	Yes	1-16	20-321	Two 8-bit, six 16-bit, one 32-bit	2	1	None	Desktop	21.4 x 16.3 x 6.7	52	Vendor	$3,450-$11,790
	PC 201	MS-DOS	18	Yes	1-16	20-321	Two 8-bit, six 16-bit, one 32-bit	2	1	None	Desktop	21.4 x 16.3 x 6.7	52	Vendor	$3,195-$11,500
Wyssen, Inc. (212) 864-3188	GW 386	MS-DOS	20.5	Yes	1-16	40	Two 8-bit, five 16-bit, one 32-bit	1	2	None	Desktop	21.5 x 17.4 x 6.6	45	Dealers	$1,999-$2,699
Wyse Technology (800) 438-9973	Wyse PC 386 Model 3216	MS-DOS	18	Yes	1-15	1.2-150	Two 6-bit, six 16-bit	1	1	NP	Desktop	21.1 x 17.9 x 6.4	36	Vendor, dealers, third parties	$3,599-$7,799
	Microplex	MS-DOS, Xenix, Theos, Pick	20	No	1-4	40-684	Two 6-bit, five 16-bit, one 32-bit	6	3	Hercules	Desktop, floorstanding	7 x 16.5 x 24	45	Vendor, dealers, third parties	$4,000-$13,850
Zeos International (800) 423-5891	Zeos	MS-DOS	16, 20, 25	Yes	1-8	65-674	Two 8-bit, five 16-bit, one 32-bit	1	1	Hercules	Desktop, floorstanding	NP	NP	Dealers	$3,995-$10,000
Zenith Data Systems (312) 699-4800	Turbosport 386	MS-DOS	12	Yes	2-6	40	NP	1	1	CGA	Portable	13.3 x 14.8 x 4.2	14.7	Vendor, dealers, third parties	$7,999-$8,499
	Z-386	MS-DOS, Xenix, OS/2	16	Yes	1-16	40-160	One 6-bit, one 16/8-bit	1	1	VGA	Desktop	21 x 16.3 x 6.5	35	Vendor, dealers, third parties	$3,999-$7,999
	Z-386/25	MS-DOS	25	Yes	2-64	70-150	One 16/8-bit, three 32-bit	2	1	VGA	Desktop	21 x 16.1 x 6.3	40	Vendor, dealers, third parties	$6,599-$11,999

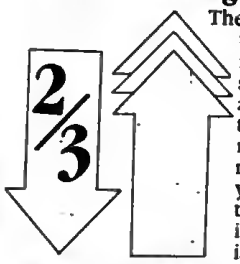
A few important tips on recruiting computer professionals

Finding computer talent isn't as easy as it used to be. In fact, there was a time when you'd just run an ad in the local newspaper and you could make a hire without waiting too long or spending too much.

But times have changed. And like so many facets of today's business, so has the effectiveness of traditional recruiting methods.

What's more, many of today's recruiters *don't use* today's most efficient methods — methods that save time and money for some widely unknown reasons.

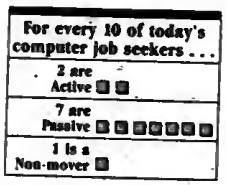
The supply of qualified professionals isn't meeting demand



The American Council on Education reports that the number of college students choosing computer careers is down two-thirds since 1982. To make matters worse, there are more computers in today's business that require the skills of this shrinking market than ever before. And while you may never consider the company next door your competitor, it likely *is* competing for the same computer talent today. The result is a classic supply/demand problem that isn't changing for the better — and that's sure to make your recruiting tougher now and into the '90s.

Ads in local papers don't reach your major hiring market anymore

That's because they generally reach "active" job seekers — those who actively seek out the local newspaper to find jobs — and who a recent *Computerworld* job satisfaction survey found to represent 2 in 10 of today's computer professionals. The study also found that 7 in 10 of today's computer professionals are "passive" job seekers — those who would *consider* new job options, but likely never look for them in the local newspaper. (The remaining small percentage are "non-movers" content with long-term jobs.)



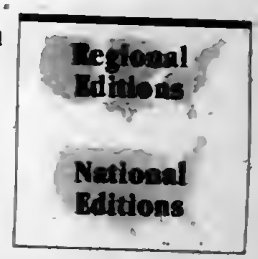
In short, this means that your ad in today's local newspaper reaches no more than 20 percent of today's computer job seekers. What's worse, if you're not using other vehicles that reach far more job seekers, your local newspaper expenses are as inefficient as their limited audience.

More job seekers see your ad in Computerworld than in any other newspaper — Sunday, daily, or trade

That's because *Computerworld* reaches over 612,000 qualified computer professionals every week — the largest audience of its kind, and one that's rich with passive and active job seekers.

That's why more companies advertise more jobs in *Computerworld* than in any other professional newspaper. And why *Computerworld* is the *single place* where America's computer professionals *expect* to see the most jobs every week.

Computerworld gives you regional editions



A key option when you need a regional candidate and want to avoid national response and relocation. Yet if your search is national in scope, *Computerworld* can also give you more widespread national exposure than any other source.

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That's comparable to most local newspapers. And why your ad can quickly appear in the next issue to start generating quality response.

Computerworld costs no more than local papers

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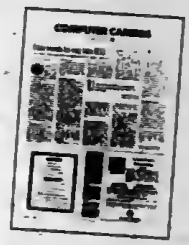
Just look at this week's Computer Careers section. You'll find a career editorial topic that will stir the interest of virtually any computer job seeker — passive *or* active. It's just one of countless reasons *Computerworld* is America's newspaper of choice on computing. No matter how much the times change.



And while times may change, some things won't. Whether you *use* computers, *make* computers, or sell products and services *for* computers, *Computerworld* is still your major source of news today. And your major source of computer professionals tomorrow.

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In the CICS world, it takes all sorts

How IS can fulfill user requests for on-line sorting in the environment

BY MARTIN GOETZ

If CICS is going to be a part of information systems for another 20 years, as IBM has claimed, then isn't it time IS updated its thinking about on-line sorting for CICS applications?

Having access to a generalized sorting utility for the development of on-line — or real-time — applications is really nothing new. At least, not if you've been developing programs for IBM's System/36 or Application System/400.

For these and other computer systems, on-line sorting utilities have often been made available as an integral part of the real-time operating system. Or sometimes they have been made available as completely separate products.

But if you've been developing CICS applications for IBM mainframes, even those going back as far as the IBM 360, then a concept like on-line or real-time sorting may seem revolutionary to you.

Goetz is chief executive officer at Syllogy Corp., an IBM systems software vendor and consulting firm located in Hackensack, N.J. He holds the first patent for software, awarded in 1968.

DAVID K. SHELDON

And that's because it is.

Indeed, because this capability has never been made available by the mainframe vendor, most CICS program designers and developers have assumed that there must be something particularly insidious or dangerous about real-time sorting within the environment. In keeping with that line of thought, application developers have spent decades searching for ways to circumvent the need for on-line sorting.

Historical stumbling blocks

The absence of a sort utility for CICS traces back to limitations of the IBM 360, which came out 25 years ago.

When it was first released, the 360 provided several basic batch operating systems along with a Cobol compiler, a generalized batch sort and other systems software. This was followed in the late 1960s by the availability of the CICS teleprocessing monitor to support the building of on-line applications.

But because the CICS monitor was, in a sense, a mini-real-time operating system that ran under the batch operating system, there were several restrictions that needed to be applied to the building of CICS applications using Cobol.

The most severe of these was that the application developer could not use the Cobol language's "SORT" verb in the CICS application. If it was invoked, the resultant Cobol program would call and execute the batch sort utility in the CICS partition, and CICS would crash.

There were other hardware and software characteristics of the 360 line that contributed to the general agreement in data processing departments that on-line sorting was to be avoided at all costs.

For instance, because of valid concerns about resource utilization, the motivation was never there to build an on-line sorting capability. By today's standards, CPU speeds were lethargic, I/Os were slow, internal memory space was at a premium, and operating system speed and function was limited. Thus, even if CICS would not crash entirely, the system would certainly have been brought to its knees by on-line sorting.

The upshot has been that, for 20 years, application designers have had to respond to user requests for sorted information displayed on-line in one of four ways:

- They could provide the sorted

• Circuitous methods no longer necessary

• Real-time displays of sorted data possible

• It's not just for the System/36 anymore

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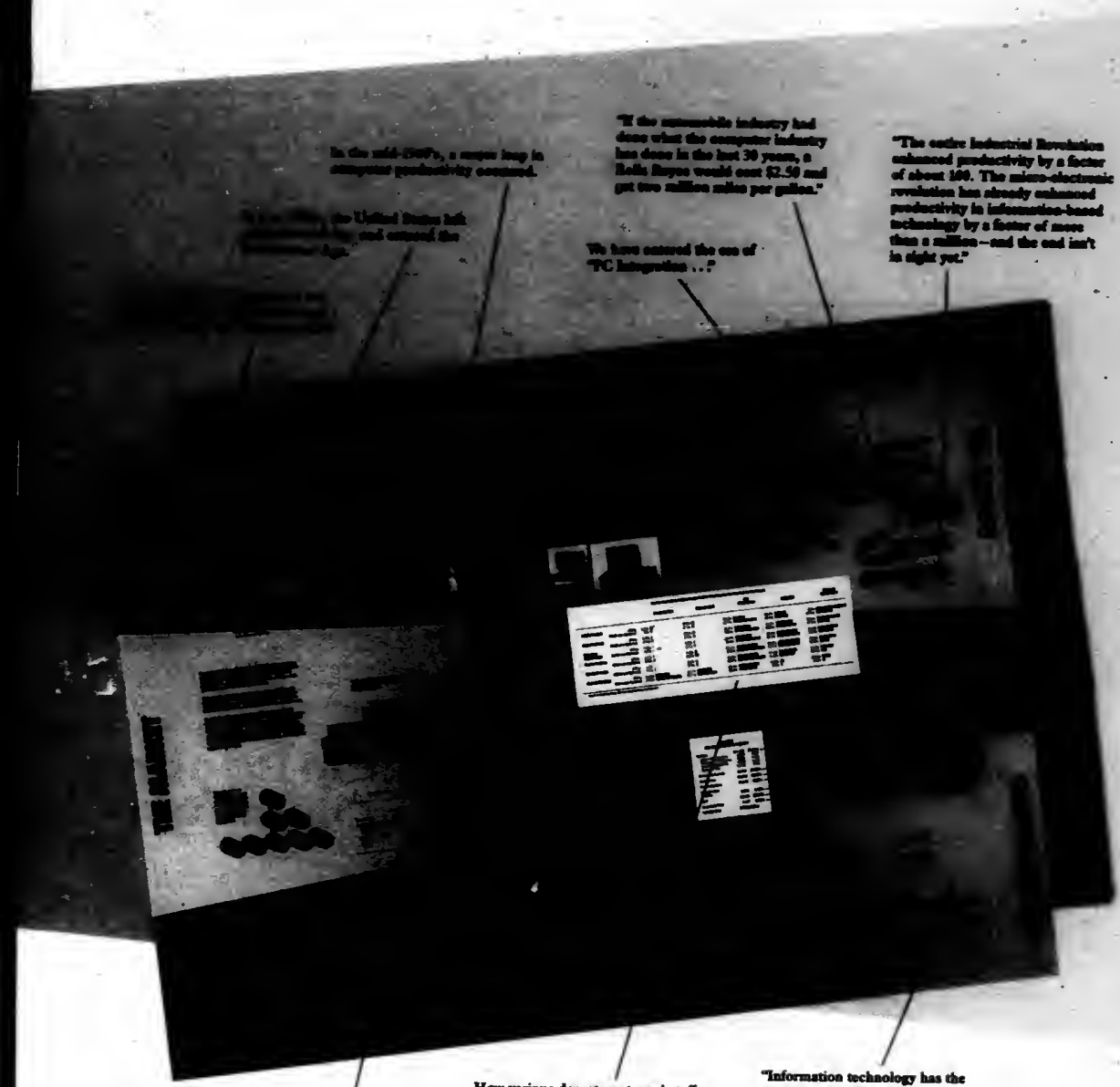
As technology has changed from mainframe to mini to micro – and as low-cost computer-to-computer communications has become a reality, these professionals have adopted the new technologies in a never-ending effort to keep their corporate information systems current. And they have relied on *Computerworld* to keep them abreast of the incredibly rapid changes that have characterized this business since the beginning. Today, *Computerworld* has a total audience of more than 600,000 computer professionals (ABC-audited). And it is truly the newspaper of record for information systems management.

To put everything in perspective, we have taken a brief look at where this young industry has been and how it is doing right now. It's all shown in the poster pictured here. Life size, it's 26″ by 38″, and it's full of interesting information on the new Information Age.



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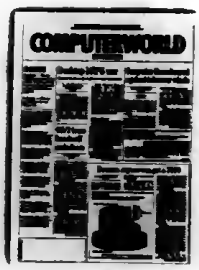

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information as a part of an independent batch operation.

- They could program specialized internal sorts into their applications.
- They could design their VSAM files — or database management system files — so that alternate indices would maintain specific data in the desired sequence.
- They could reject the user's request.

Like good sports, most CICS veterans have tacitly accepted the inability of the CICS environment to allow for on-line or real-time sorting. So, where possible, they have responded to users' needs by employing the circuitous routes outlined above.

Of the possible alternatives, the most frequently used has been that of maintaining data in a specific sequence. This has meant that, to satisfy user requests to have information on screens or summary reports appear in a desired order, application designers have had to spend time preparing specially sequenced VSAM files or databases or designating alternate indices for retrieving the data in the desired sequence.

But this approach has not only proved technically complicated and time-consuming, it has also added many layers of grief to the maintenance and enhancement of these systems once they are put into production.

Many applications required the creation of alternate indices for VSAM files so that data could be displayed in the varying sequences that screen and report output dictated. But, because of the restrictions of VSAM, a separate alternate index for each sorted sequence usually needed to be established.

For example, consider a VSAM file in which the records contain a customer identification number, an order number, the date of the order, the planned date of delivery, the status of the order, the salesperson and the amount of the order.

Assume, in addition, that a user has requested an order-entry application that must produce the following on-line screens or reports for all orders for a specific customer ID:

- Sorted by date of order and amount of order.
- Sorted by amount of order.
- Sorted by planned date of delivery and amount of order.
- Sorted by salesperson, date of order and amount of order.

To satisfy the requests for these four desired screens (see chart, left), four alternate indices would have to be established according to the above sorts, with each index beginning with the same customer ID. Each sorted sequence would then require a separate secondary index.

This example is by no means extreme. It is not unusual to require 10 or 20 alternate indices to satisfy the different ways in which data must be displayed for a VSAM application.

Other complications

But the time it takes to create the alternate indices is not the only complication of this technique for application designers and database administrators. The process can extract a high cost in other areas, including disk space, I/O accesses, CPU time, operational and programming complexity and program maintenance time.

- **Disk space.** For each alternate index associated with a VSAM file, there are additional disk-space requirements for storing that index file. And, in most cases, the VSAM records must be enlarged to hold the redundant information that forms the alternate search keys to be sorted. On top of this, more buffer space is required as well.
- **I/O and CPU time.** Each time a record is updated, there are CPU and I/O costs associated with updating the alternate index and the related additional search keys in the VSAM record. These alternate indices must be updated continuously, even when the sort occurs only periodically — once a month, once a week or once a day.

In addition, if these files are

Examples of on-line sorted screens in a VSAM file

Some users require applications that must produce certain on-line screens with certain headings

VSAM file records

- Customer ID
- Order number
- Date of order
- Planned date of delivery
- Status of order
- Salesperson
- Amount of order

CW CHART: FRANK C. O'CONNELL

designated as recoverable by CICS, there will be CPU and I/O costs associated with the maintenance of the CICS Journal File.

• **Operational complexity.** The addition of alternate index files creates several significant operational problems as well. For instance, each new alternate index file must be initialized through a special utility.

Further operational complexities are involved in backing up and restoring a VSAM cluster because the base VSAM file and all index files must be backed up at the same time.

• **Program maintenance.** When the addition of an alternate index requires that the VSAM file be modified, it is not unusual to need to modify all of the programs that refer to that file. This is expensive in terms of programmer time, and it also requires considerable testing to confirm that the program changes did not corrupt the operational system.

• **Programming complexity.** In many sorting situations, the use of alternate indices is not an easy or convenient way for programmers and designers to get sequenced data.

This is true, for instance, in cases in which there is a need to produce data by descending search keys or by numeric fields in which the data can be either positive or negative.

The alternative of sorting on-line within the CICS environment offers a more efficient solution compared with the use of several alternate indices.

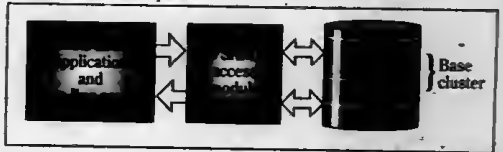
Primary access

For instance, in the above example, there is no need to establish any alternate index if the VSAM records that are given to the real-time sort are accessed by the primary Customer ID search key. All of the fields to be sorted are defined to the sort separately and can be located in any positions within the VSAM record.

The actual sorting of any number of search keys — such as Date of Order, Amount of Order, Salesperson and so on — can be performed by the on-line

A CICS user application with on-line sorting

Using on-line sorting, a single access against the primary index can generate all desired reports



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SORTING on-line in the CICS environment offers a more efficient solution compared with using several alternate indices.

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sort. A single access against the primary index (see chart page 107) can generate all of the four desired reports.

So, depending on the file design, the application and the types of information needed to be sorted, the data can be extracted by accessing only the primary index or a limited number of alternate indices.

And if there is a request, for example, to sort by Salesperson as the major search key, one alternate index can be established to produce many combinations of sorted information.

Furthermore, system performance is enhanced with on-line sorting. There is no need to update or maintain the indices. The amount of required disk space is reduced. And additional sorted screens or reports can easily be added or modified without changing any file designs.

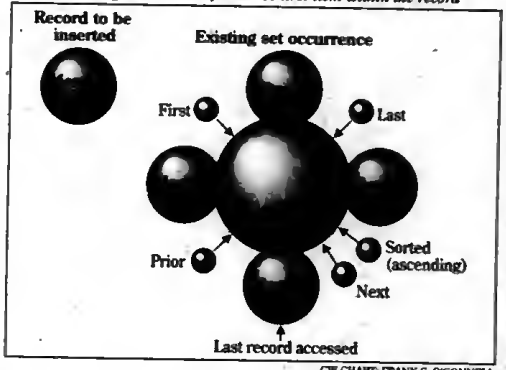
In network DBMSs — such as IDMS — sets are defined as named collections of records that have an "owner" record type and one or more "member" record types. Sets can be established as either sorted or unsorted.

In many instances, sorted sets are established when a report or screen must be produced on-line with the output listed in a specific sequence.

This technique has many similarities to the setting of secondary indices in VSAM files. When a new member is added to the set, it is inserted into the chain according to the value of a sort-control item within the record (see chart above).

Example of sorted sets for a network DBMS

Each time a new member is added to the set, it is inserted into the chain according to the value of a sort-control item within the record



CW CHART: FRANK C. O'CONNELL

Eliminating methods

Given the availability of a generalized real-time sort utility, these methods of producing on-line sorted output can also be eliminated. The net result is simplification of database maintenance, execution of the sort only when the report or screen is specifically requested, elimination of expensive updates to the databases and simplified systems maintenance.

In hierarchical DMBSs — such as IMS — ordered records have often been used to accomplish sorting. But this solution, too, is slow and expensive.

Using the IMS search field for sorting not only complicates the IMS design, it is also a very time-consuming method of accessing records.

In this case as well, real-time sorting within the CICS environment saves time and money. Where there is a parent/child relationship established, the sort utility can be used to eliminate the need for ordered records.

So, after 20 years, on-line or real-time sort utilities can provide program developers with a reasonable alternative for meeting the sorted screen and report requests of end users. From here, education and acceptance become the key issues.

But old bugaboos die hard. And most system designers, especially those less than 35 years old, do not understand that the only thing that has been holding them back is adherence to a 20-year-old technology.

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MOST SYSTEMS DESIGNERS, especially those less than 35 years old, do not understand that the only thing that has been holding them back is adherence to a 20-year-old technology.

And today's operating systems — such as IBM MVS, MVS/XA, MVS/ESA and VSE — coupled with enhanced CICS services have matured. Indeed, the old reasons for avoiding on-line sorting have disappeared.

As the fears of degraded response times and crashed systems abate — which surely they will as the "new" technology of on-line sorting is proven to be successful and as its performance becomes statistically observed — the days of complicating the design of databases and VSAM files through special indices and search keys will finally end.

End-user requests for sorted data will be met with a smile from the IS department, thanks to the simplicity of real-time sorts. ●

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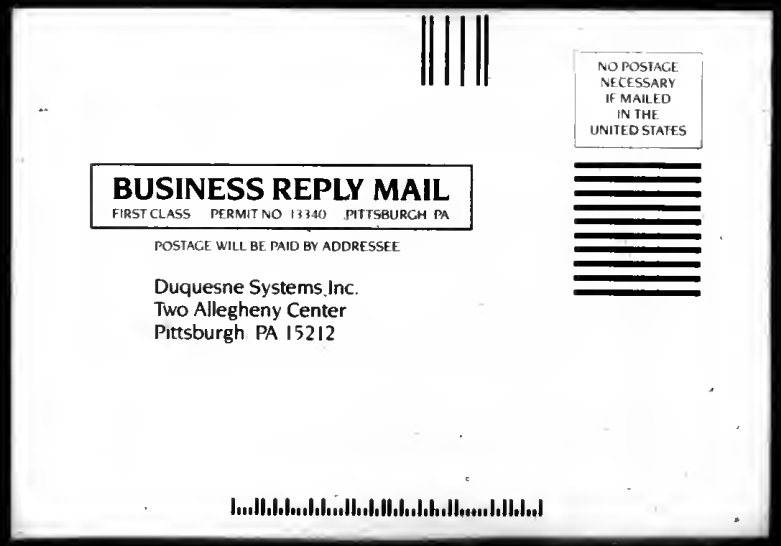

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INDUSTRY INSIGHT

Peter Bartolik

Snipe the hype

Dueling press releases aside, the clear-cut loser so far in the legal battle over Microsoft Corp.'s Windows 2.03 is marketing hype.

Due to the fact that the Seattle Slinger was undercut by its own marketing claims, the scorecard in this corner gives the first round to Apple Computer, Inc.

Keep in mind that Microsoft and Apple are readying for a legal conference this Friday on the next stages in the copyright infringement battle. Nevertheless, industry pundits are rabidly debating the words issued March 21 by U.S. District Judge William W. Schwarzer and the competing claims of victory quickly issued by both compa-

Continued on page 113

Ardent rolls up its shirtsleeves

Says fight for success in the graphics supercomputing market just beginning

BY JEAN S. BOZMAN
CW STAFF

SUNNYVALE, Calif. — Ardent Computer Corp. says it has only just begun to fight.

The 3-year-old graphics supercomputer start-up has already shipped 200 of its Titan systems, 132 to paying customers. But, according to Ardent Chief Executive Officer Allen H. Michels, the units have yet to reach many commercial sites.

Michels, who said recently that he anticipates shipping nearly the same number of systems this year, is not worried. The company is still growing on its original bankroll of $57 million in venture capital — $44 million of it from Kubota Ltd., a Japanese manufacturer of industrial equipment. Even as industry analysts fault him for failing to ship more systems, Michels said he is negotiating sales to national research laboratories and to universities.

Ardent is ramping up both production capacity and staffing in anticipation of multiple sales in the commercial sector in the early 1990s, according to Michels. Kubota is expanding the Japanese factory where all Ardent machines are made. Ardent's staff of 205 is expected to reach 275 by year's end; 60 of the new hires, Michels noted, will be in research and development.

Michels said he believes Ardent will ride the crest of a hardware trend now under way: The dramatic drop in hardware costs is bringing interactive supercomputing to the laboratory or desktop at minicomputer prices.

Ardent's Michels

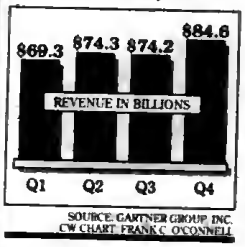
Whatever success Ardent has will come slowly and in stages, according to Michels. "It's on the development side where you'll begin to see our Titan machines," he predicted (see story page 113). "You may even see them lined up side by side. Price/performance is everything in our business right now. Later on, it will be less so. Later, it'll be more dependent on applications." Titans cost between

Continued on page 112

Data View

Industry '88

The information industry — including DP, telecom and electronics components — grew 11% last year



SOURCE: GARTNER GROUP INC.
CW CHART: FRANK C. O'CONNELL

Mapping the road to survival

ANALYSIS

BY JAMES DALY
CW STAFF

While meteorologists will look back on the past year as the time of the great drought, the computer industry will remember it as the period when the minisupercomputer industry dried up.

The market's dozen or so major players are now engaged in a frantic game of bumper cars, and the stakes may be nothing short of survival. Meanwhile, the specter of losses, layoffs and shakeouts hovers nearby.

The damage began last year with a vengeance:

- Celerity Computing began handing out pink slips in February 1988. Faced with bankruptcy, the firm was then acquired by Floating Point Systems, Inc., which soon initiated layoffs of its own.
- In July, Prime Computer, Inc.

Continued on page 112

Mips casts line and sinks hooks into rival execs

BY J. A. SAVAGE
CW STAFF

SUNNYVALE, Calif. — Following the example of a former Apple Computer, Inc. senior executive who defected to Mips Computer Systems, Inc. earlier this year, three more executives from rival companies have signed on with Mips' marketing group.

Making the shift from Digital Equipment Corp.'s workstation sales were U.S. manager of workstation sales Joe DiNucci and head of workstation sales strategy James Billmaier. Neither executive professed any animosity toward DEC, which is both Mips' competitor and a partner in the reduced instruction set computing (RISC) workstation market. Rather, they said, they were impressed with Mips.

"When I saw [Senior Vice-President of U.S. Sales Charles] Boesenberg come over from Apple, I thought, 'This is really getting interesting,' " DiNucci said. As Mips' first vice-president of strategy development, DiNucci has responsibility for strategy development across all product lines.

Billmaier, in the newly created job of vice-president of market development, will focus on the advancement of the company's Application Binary Interface.

Cough drops

Mips' major competitor, Sun Microsystems, Inc., coughed up another executive for Mips by way of software maker Frame Technology Corp.

John Hime, formerly Sun's workstation marketing director and, until last week, vice-president of marketing at Frame, is now vice-president and general manager of Mips' systems products group.

Hime claims that Mips' RISC technology has a larger market appeal than the product he was trying to sell at Sun. "Sparc was designed for certain kinds of technical workstations," he said. "Mips has broader design goals."

Frame painting pretty picture for itself

BY JULIE PITTA
CW STAFF

SAN JOSE, Calif. — When some of the heavyweights of the personal computer software industry recently announced that they would create applications for the Next, Inc. workstation, they were following in the footsteps of a tiny Silicon Valley start-up.

Frame Technology Corp. bears the distinction of being the first independent software developer to port to the Next computer. While industry watchers wondered aloud about the Next machine, a Frame software engineer spent a year at Next headquarters working to port Framemaker, the firm's publishing package for Unix-based systems, to Next.

After nearly three years of silence, Next founder Steve Jobs ended all the speculation at a gala event in San Francisco last fall. Notably absent were PC software giants such as Lotus Development Corp., Microsoft Corp. and Ashton-Tate Corp. In the packed auditorium sat a small band of excited Frame staffers waiting for their president to take the stage.

It never happened. Jobs got so caught up in showing off his new machine that a testimonial from Frame co-founder and President Steve Kirsch had to be scrapped at the last minute.

But Frame did not go entirely unnoticed. A demonstration of Framemaker running on the Next workstation was prominently positioned outside the auditorium doors. "Right after the press conference our phones started ringing, and they haven't stopped," Kirsch said.

At a recent press conference, Jobs made up for his omission. "Frame was one of our first developers," Jobs said. "And it's one of the most successful products on our platform. It's a dynamite document-processing package."

Frame is also currently holding discussions with Businessland, Inc.

No surprise

The union of Frame and Next, both 3-year-old start-up companies, should not be surprising to anyone who knows Jobs. It is also typical of how Silicon Valley works: Casual acquaintances often intensify to become business relationships.

"Steve Jobs likes young, entrepreneurial companies," a source close to both Frame and Next said. "The Frame people are a group of young, creative people. Steve Kirsch is very much an MIT computer jock." Also, Cambridge, Mass.-based Interleaf, Inc., the market leader in Unix-based publishing software and Frame's rival, was already committed to IBM and Apple Computer, Inc.

Jobs became acquainted with Frame's Vice-President of Advanced Development David Murray when Jobs was at Apple and Murray was at Filevision, a now-defunct third-party developer for Apple's Macintosh microcomputer. Although Filevision was not expected to be successful, its product caught Jobs' attention.

Frame's relationship with Next is its second with a hot Silicon Valley workstation company. The original platform for Framemaker was Sun Microsystems, Inc.'s Unix-based workstations. Like Next, Sun is considered a computer-industry rebel, particularly in its quest to create a single version of Unix.

What may have gained the attention of both Next and Sun is

Continued on page 113

Survival

FROM PAGE 111

wrote off $5.1 million in sundering its agreement with minisuper maker Cydrome, Inc., and Alliant Computer Systems Corp. recorded its first quarterly loss.

• Later that month, Saxpy Computer Corp. put up a for-sale sign.

• In January, Alliant axed one-fifth of its positions.

Analysts said problems began when vendors focused on bettering their competitors' technical specifications and gave little thought to user concerns.

"Customers don't care about Linpacks; they care about how their own tapes, running their own applications, are going to do based on wall-clock time," said Gary Smaby, managing director of Needham & Co., a market research firm.

Besides a disarming lack of software, a perpetual product transition created fundamental problems, Smaby said. "Customers get confused," he said, "and they delay purchases, which leads to reduced revenue."

Only Convex Computer Corp. seems to have healthy financials. The Richardson, Texas-based company logged 1988 revenue of $105.6 million, a 52% increase over 1987.

But the smoke has yet to clear, and several vendors are shoring up their defenses. Alliant, for example, added greater visualization capability to its minisuper line, while Multiflow announced plans to merge with workstation manufacturer Advage, Inc. [CW, March 27].

Not all such strategies have been successful. "Scientific Computer Systems tried to be a Cray look-alike and found that people preferred the real thing," said Bob Trier, director of technical programs at Research Consortium, Inc. in Minneapolis. SCS has since switched its efforts over to high-performance networking.

Minisuper vendors are also feeling the heat from above. Graphics supercomputer maker Stellar Computer, Inc. last week announced a machine that it claims offers the performance of a minisuper at less than one-third the price.

Some say this shakeout is just the tonic the niche needs to survive. "The maturation process is complete," Trier said. "Sure, there'll be some more shifting, but I think we'll be seeing even more entrants into the market."

Still, if the lean days in the minisuper field pass, the survivors in what is estimated to be a $1.5 billion market by 1991 may find they have endured only to see their harvest gathered by industry giants such as Digital Equipment Corp. and IBM.

IBM seeks to promote vector facilities as attractive add-ons to its 3090 mainframes. Meanwhile, rumors continue to surface that DEC might enter the market with a VAX vector processing machine, possibly as early as September of this year.

Computer Intelligence, a market research firm, estimates that more than 20,000 high-end 8800 series VAXs are installed; analysts estimate the number of minisupers at around 700. Smaby said DEC could capture 20% of the market within a year of a product introduction.

Ardent

FROM PAGE 111

$80,000 and $150,000 each. Michels declined to say how much Ardent is making.

Commercial applications should emerge, Michels said, within the development divisions of major pharmaceutical, chemical and aerospace companies. But some industry analysts are skeptical about Ardent's chances of breaking out as a large-scale manufacturer of minisupers. "The problem they're running into is that they found a niche that closed up very quickly," said Chris Willard, senior industry analyst at Dataquest, Inc. in San Jose, Calif. "It remains to be seen if there's a large segment of the market which has $100,000 to spend for just a few users."

Willard explained that technical and scientific users now have the ability to choose ever more powerful reduced instruction set computing (RISC)-based workstations that perform visualization applications at a price of

Bartolik

FROM PAGE 111

nies. Never one to hesitate in donning the pundit's robe when he edited this section, your humble scribe decided to take keyboard in hand and see what spin he could put on the muddy catfight.

So, with the press releases relegated to the round file and a deaf ear turned to the official spin controllers, your would-be paralegal went right to the written Memorandum of Decision and Order penned by the honorable Judge Schwarzer.

It's a pretty simple document to read, given the technology issues involved and the fact that it was drafted within days of a hearing on motions from Apple and Microsoft. The pretty simple fact that comes out of that reading is that there is to date no clear winner or loser in the courtroom, although the user community may indirectly benefit from this precedent if the industry takes note that Microsoft was damaged by its own advertising campaign.

To sum it up, the judge ruled that, yes, Microsoft had a valid license to use certain visual aspects of Apple's Macintosh technology in Windows 1.0 and future products. Great for Microsoft, you would think.

But, in a stunning challenge to standard software industry practice, Judge Schwarzer held that Windows 2.03 is significantly different from Windows 1.0. That, he said, repudiates Microsoft's claim that a licensing agreement from Apple for the earlier Windows product can be extended to the later, enhanced product.

Now, your humble hacker has used both versions of Microsoft's interface, and, other than the fact that the boss coughed up the bucks for an Enhanced Graphics Adapter screen that provides for colorized Windows, he would swear that 2.03 was merely an enhancement of 1.0.

> NOW, YOUR humble hacker has used both versions of Microsoft's interface, and he would swear that 2.03 was merely an enhancement of 1.0.

Being somewhat jaded about marketing campaigns, this casual personal computer enthusiast didn't listen when Microsoft said 2.03 was a new and wonderful product featuring overlapping, rather than tiled windows displays.

Well, the judge apparently puts more significance on marketing claims than you'll ever find in these pages. He noted that a key claim to fame of 1.0 was the fact that Windows did not overlap and that users for it were advised they would "never 'lose' a window." When marketing 2.03 as a "new visual interface with overlapping windows," Microsoft pointed out that a key difference in the later product was that it did not use tiled windows. Hence, in the judge's view, 1.0 and 2.03 have "fundamentally different" visual displays.

Score Round 1 for Apple, but don't wire any congratulations to John Sculley just yet. All it means is that the licensing agreement for Microsoft to produce Windows 1.0 is not a complete defense for what it did with 2.03. Despite the churnings of Apple and Microsoft public relations staffers, he has yet to rule that what appears in the overlapping windows of 2.03 infringe upon Apple's copyrights, or even whether Apple's copyrights are valid.

There is a clear message here for the software industry to cut back on the marketing hype. The ruling from this would-be pundit holds that Microsoft weakened its best legal hedge — the licensing agreement — by overselling 2.03 as more than a well-thought-out enhancement of 1.0. If the industry learns a lesson from that, we'll all be better off.

Bartolik is Computerworld's news editor.

Frame

FROM PAGE 111

Framemaker's graphical user interface. Both companies seem to recognize the need for Unix to become an easy-to-use operating system. "We've always tried to make software easy to use and approachable," Kirsch said.

"Unix is a desirable platform because of its power," said Ajit Kapoor, a vice-president at market research firm CAP International, Inc. "But between these products, it's really six of one and half-dozen of the other. The name of the game is having good distribution alliances. With Sun and Next, I think Frame has a very good future."

To augment its team of young software engineers, Kirsch hired a couple of sales and marketing veterans. Former Sun marketing director John Hime joined Frame to lead the marketing team, and former Interleaf sales executive Steve Klann is the sales vice-president.

Hime resigned last week to become marketing vice-president at Mips Computer Systems, Inc.

> "RIGHT AFTER the press conference our phones started ringing, and they haven't stopped."
>
> STEVE KIRSCH
> FRAME

Privately held Frame had more than $8 million in sales last year. About 71% of its sales were to large corporations. As Next moves beyond the university market in the next few months, Frame's tiny team stands ready to share some of the spotlight.

IN BRIEF

Growing . . .

Palo Alto, Calif.-based Ross Systems, purveyor of financial and accounting software to the Digital Equipment Corp. VAX platform, announced its intent to acquire Needham, Mass.-based distribution software and consulting company Cardinal Data Corp. Ross will hold Cardinal as an autonomous subsidiary.

. . . . . .

Going . . .

Former IBM executive and Xerox Corp. Vice-Chairman William Glavin will retire early from Xerox, effective June 1, to become president of Babson College, a business school in Wellesley, Mass. The 57-year-old executive will also retire as a director of Xerox and a member of its four-person corporate office.

. . . . . .

Gone

In line with its goal to focus on systems integration rather than packaged systems, Computer Sciences Corp. announced a mid-March sale of its Compufact division to Santa Clara, Calif.-based Medic Corp., a spokesman said. Like its new owner, Compufact sells turnkey manufacturing systems that run on Prime Computer, Inc. platforms.

. . . . . .

Difficult decision

NCR Corp. last week announced plans to market its wares in South Africa through distributor Fintech, Ltd., a subsidiary of a South African-owned group of technology companies. The decision, an NCR executive said, was a difficult one. Terms of the deal were not disclosed.

. . . . . .

Wyse decision

Troubled microcomputer products vendor Wyse Technology, which earlier this year warned that an imminent quarterly loss endangered the status of its principal loan agreement, last week announced that it has obtained waivers that will keep the $20 million outstanding credit line open through June 30.

$20,000 and up. At the same time, supercomputer vendors such as Cray Research, Inc. and Control Data Corp. have lowered the entry price of true supercomputers to less than $2 million.

Having a business partner like Kubota could help Ardent survive any coming industry shakeout in the minisuper segment (see story page 111), said analyst Jeffry Canin. "Kubota is a business partner with deep pockets," Canin said. "Like other Japanese firms, they're adopting a long-range perspective when they make investments. It's really too early to say whether Ardent will be a success or a bust. You really have to wait a couple of years, and Ardent can afford to do that."

Before most commercial sites will even try Ardent hardware, they want to see working software applications.

"Many of the large companies don't even want to see a machine until they see those applications running," explained Gale Aguilar, Ardent's vice-president of industry marketing.

For that reason, Ardent has also started a program under which Titan application software is being produced by scientific laboratories and universities. Among the participants are NASA/Ames Research Center in Northern California, Los Alamos National Laboratories in New Mexico and Lawrence Livermore National Laboratories in Livermore, Calif.

Michels, a co-founder of Convergent Technologies, Inc., now part of Unisys Corp., hired a team of computer industry all-stars for his latest venture. Gordon Bell, designer of the Digital Equipment Corp. VAX machine, is Ardent's vice-president of engineering, research and development, and Gregory Hopwood, formerly director of technical support at Gould, Inc.'s Computer Systems Division, is vice-president of product marketing. In January, they were joined by Aguilar, a 27-year IBM veteran who was vice-president of marketing at Prime Computer, Inc. in Natick, Mass.

Select group

According to company President Allen H. Michels, users of Ardent Computer Corp.'s Titan graphics computers fall into three broad application categories: chemistry, fluid dynamics and mechanical computer-aided engineering (MCAE). The first two categories account for about 20% of all Ardent shipments. The remaining 60% is divided among MCAE applications and those in physics research, computer-science research and signal processing.

Titan users can interactively change wind-tunnel simulations on-screen or carry out a simulated crash of an automobile in real time. These applications formerly were directed at traditional supercomputers. Number crunching on a conventional supercomputer that handles batch jobs for hundreds of users often takes minutes or hours — and the results have to be shipped for later display on a user's workstation.

The relatively small number of Titan users seem to be happy with the product. United Technologies Corp.'s Research Center in Hartford, Conn., has been using two Titans since May 1988. Bob Olsen, manager of aeromechanics and thermal sciences, said that the machines are used to animate preprocessed data to demonstrate airflow around helicopter blades. One Titan tends to be used by a single graphics-support person who animates the data displays. The others, Olsen said, serve more than a dozen end users over a local-area network.

JEAN S. BOZMAN

Surviving a restructuring

Be prepared: Keep a high profile, maintain contacts, broaden abilities

BY ALAN RADDING
SPECIAL TO CW

When James McCormick was the corporate vice-president of MIS at Transways International Corp., a diversified transportation organization that was involved in a takeover battle in 1985, he lacked a broad base of contacts in the MIS profession. "In retrospect, I didn't have nearly as much outside contact as I should have. I was cocky. I felt good about Transway," he says.

Today, he is a partner at Eastbourne Consulting Group, a management consulting firm specializing in cost containment and loss control, an opportunity that he says came about when he reestablished contacts with former associates from his pre-Transway days.

From the Transway experience, McCormick learned some valuable lessons about how to survive a corporate restructuring. First, he says, always return telephone calls from headhunters, even when you are not considering any change. Always return calls from reporters, too, because they can provide visibility. Finally, return calls to consultants, because the more people you know, the more options you possess when problems arise.

It is possible to successfully navigate a corporate restructuring, acquisition or downsizing. But the key is to establish the elements of your survival strategy in advance, long before you are faced with a major change. It is unwise to assume that the ax will never fall or to wait until it does to take action, managers and consultants say.

Nothing lasts forever

"It may sound cynical, but you can't depend on the company to take care of you forever. These days, nobody feels they owe you anything," says Donald Sweet, a human resource management consultant based in New Bern, N.C. Even a golden parachute, which only the highest level executives can command, does not guarantee that you will come out unscathed. In some instances, an executive may need to go to court to get the golden parachute enforced.

Surviving a corporate restructuring means positioning yourself so that you can continue to advance your career with minimal disruption, whether you remain at the restructured organization or move on. In addition to keeping your skills sharp, it helps to maintain a high profile within the profession and build an extensive network of MIS industry contacts. Also important are broadening skills and experience and maintaining good relations with people throughout your organization.

"People must develop their network before a merger or restructuring is announced," says Howard Pines, a principal at Beam Pines, Inc., a New York-based outplacement firm. While it is never too late to start, you cannot expect to boost your profile or build a network overnight.

Pines emphasizes the importance of publishing papers, playing an active role in trade associations by volunteering to participate on committees and speaking at industry functions and conferences.

Gary Biddle, vice-president of information systems at American Standard, Inc. in New York, is active in professional activities and, as a result, has a high profile.

Still, if Biddle, a 32-year veteran at American Standard, suddenly found himself being bumped from his organization in the kind of restructuring that almost took place there, that network of contacts would be a tremendous asset.

American Standard recently thwarted a hostile takeover bid through a leveraged buyout by top management. As the news spread concerning the hostile takeover, Biddle started receiving telephone calls from his outside contacts inquiring if he or any of his top people would be available.

> "IT MAY SOUND cynical, but you can't depend on the company to take care of you forever. These days, nobody feels they owe you anything."
>
> DONALD SWEET
> HUMAN RESOURCE MANAGEMENT CONSULTANT

Diane Chilton, a human resources information systems supervisor at Dallas-based Southland Corp., also weathered a restructuring in which the company was taken private. "A lot of people were laid off," Chilton notes. But by remaining flexible, she managed to advance in the organization.

Within Southland, the majority of jobs fall in the central personnel department or in the 7-11 stores that the company operates. Chilton says her ability to move from the smaller MIS group into personnel possibly saved her career at the firm.

A programmer, she started at Southland in MIS and found herself assisting the personnel division. She displayed the communication and personal skills that are important in human resources; with that combination of talents, she attracted attention and was asked to join the personnel department as the liaison to MIS.

Survival training

Chilton's experience illustrates other key elements to surviving a restructuring, consultants say. First, you must be good at your job, and you should broaden your experience. Second, nontechnical skills play a vital role, especially higher up in the company. Finally, you need to maintain good relations throughout the organization, not just with your immediate supervisors.

Fortunately, IS people are better positioned to survive a corporate restructuring than most employees because of the strong demand for their skills, Biddle says. There is such a shortage of qualified people, he says, that the odds are good that other firms will be interested.

Furthermore, IS people can do much more than survive. Looking back on the Transway experience, McCormick says, "Frankly, it was the best thing that ever happened to me."

Radding is a Newton, Mass.-based author specializing in business and technology.

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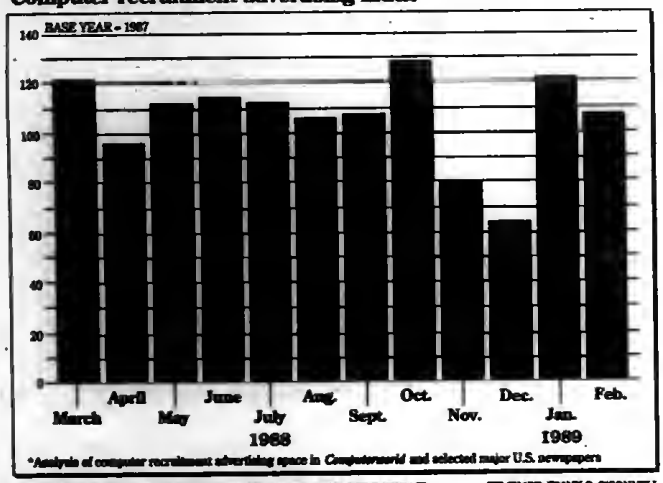

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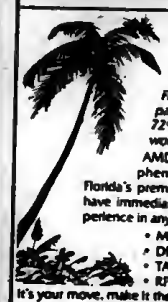

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The Switch

The Newsletter for Telecommunications Professionals
April 10, 1989

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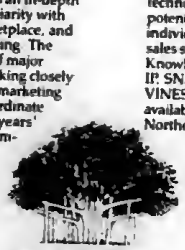

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MARKETPLACE

Controller market softens

New IBM communication controllers put a dent in the used marketplace

BY BENJAMIN T. GALE
IDC FINANCIAL SERVICES CORP

Secondary market prices for IBM's 3725 communication controller have declined severely during the last 12 months. This downward trend began on Jan. 26, 1988, when IBM announced its 3745 high-end communication controller.

Because the 3745 can perform two to four times the work of a 3725, users, in many cases, can replace multiple 3725s with a single 3745. The announcement of the 3745 aroused concern from users of 3725s, causing values of used 3725s to drop. Once the 3745 Model 210 began shipping in March 1988, 3725 values began to drop even faster. This imbalance caused the current tremendous supply of 3725s on the secondary market.

According to Framingham Mass.-based IDC Financial Services Corp., used retail values for the 3725 dropped 72% on the secondary market between March 1988 and March 1989. Currently, the supply of used 3725s is far outstripping the demand, which is the primary reason the 3725s have lost their value so rapidly.

Additionally, rumors of IBM announcing a smaller version of the 3745 have also contributed to the decine in used 3725 values. The current 3745 models are more of a migration path for 3725 users, whereas the smaller version of the 3745 would be considered a direct replacement of the 3725.

Baby steps

This low-end version of the 3745 would likely offer the same processing power as the 3745 — but with a smaller footprint. The number of lines supported would also be similar to the 256 lines that are handled by a 3725. In addition, the low-end 3745 would support T1 lines; the 3725 does so, but only one T1 line can be installed and only through a request-for-price quotation.

Because the 3725s have lost their value so rapidly, some end users have elected to retain their machines rather than replace them on the secondary market.

Instead, the users are upgrading their 3725s by installing additional memory and features. Thus, demand for memory has strengthened, and used values have increased. For instance, additional memory available in 256K-byte increments is trading for 85% to 95% of list price on the wholesale market.

Dealers report that supplies of both memory and features are good, which illustrates that it is not the lack of supply that has forced up the used values of memory and features, but the strong demand. Also, a dealer can deliver memory and features to a customer faster than IBM — another reason dealers can command these high values.

IDC Financial Services forcasted that values of used 3725s will level off by year's end as they reach low price levels. Over the last four to five months the price decline of 3725s has slowed, although the market is still dropping approximately two points per month.

The 3720, IBM's low-end communication controller, is beginning to trade on the secondary market. This machine, which began shipping in 1986, has been slow to trade on the used marketplace. IDC research shows that the 3720 is more popular in Europe because there is a larger installed base, and machines are already trading on the used marketplace.

Currently, the 3720 Model 1 is the most popular machine within the 3720 communication processor family. This model provides direct attachment to the host processor through a byte multiplexer, block multiplexer or selected channel of host processors.

According to IDC, demand is so strong for this model, that if a used Model 1 does become available, the machine could be sold or leased in less than one day. Used values for the Model 1 and the 3720 Model 11 on the wholesale market fall in the range of 90% to 95% of list price, while retail values are close to IBM's list price. The high used market values exist because dealers can deliver machines to customers faster than IBM.

Low demand for others

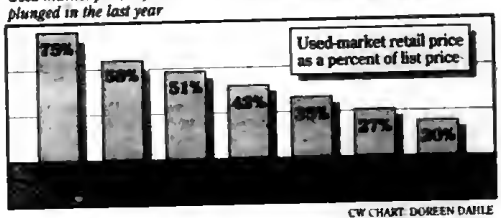
Demand is weaker for Models 11 and 12, which can be upgraded from Models 1 and 2, respectively. The machines can attach to two Token-Ring interface couplers; however, demand for Token-Ring capability has been weak so far.

The 3745 is currently not available on the secondary market because it has been shipping for more than a year. IDC Financial Services sources report that demand for the machine has been reasonably strong.

For more information, contact IDC Financial Services' Terri LeBlanc at 508-872-8200.

Controller contraction

Used-market prices of IBM's 3725 communications controller have plunged in the last year



CW CHART: DOREEN DAHLE

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Used/Lease/Rent

The BoCoEx index on used computers

Closing prices report for the week ending March 31, 1989

	Closing price	Recent high	Recent low
IBM PC Model 076	$700	$750	$550
XT Model 086	$1,000	$1,150	$900
XT Model 089	$1,225	$1,575	$1,000
AT Model 099	$1,750	$2,000	$1,525
AT Model 239	$1,775	$2,100	$1,775
AT Model 339	$2,100	$2,375	$1,800
PS/2 Model 30	$1,375	$1,550	$1,000
PS/2 Model 50	$2,100	$2,400	$1,900
Compaq Portable I	$650	$750	$550
Portable II	$1,900	$2,100	$1,750
Portable III	$2,750	$2,950	$2,500
Portable 286	$1,800	$1,975	$1,675
Plus	$1,050	$1,250	$900
Deskpro 286	$2,100	$2,350	$1,800
Deskpro 386	$3,700	$3,975	$3,675
Apple Macintosh 512	$625	$775	$550
512E	$775	$975	$600
Plus	$1,050	$1,225	$1,000
II	$3,925	$4,450	$3,425
Toshiba T3100	$2,000	$2,325	$2,000
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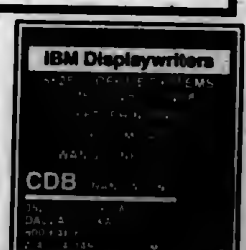

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SPECIAL TO CW

In most companies, data processing training operates directly out of the DP organization. Invariably the instructors have worked as programmers or analysts in the not-too-distant past, and it is not inconceivable that the administrative staff comes from those ranks as well.

The training unit usually has access to hardware systems and most, if not all, of the corporate software and utilities. It should come as no surprise that the technical training department rarely gets any systems development support — nor do DP development units ever construe the training department as a client or user.

The assumption that the technical training unit includes a technical staff and can take care of itself is not accurate. The instructors are busy teaching and developing courses and frequently do not possess the technical skills to develop a training management system. They certainly do not have time to run and maintain a system. It is a considerable load on the training staff to simply input all the necessary data into a system.

As skills inventories in personnel systems have been almost impossible to build and maintain, it is mandatory that companies keep an accurate record of employee participation in self-study courses, college classes, internally delivered training and public seminars.

DP training managers, however, need considerably more than a history of student activity to do their job — they need a system to analyze and report on the past, present and future.

The ideal system

If you were to build the ideal training management system, what kind of information should it maintain? For starters, student data is important. You would want names, titles, organizations and supervisors as well as training histories, including the time and place of courses; how they were delivered and how long they ran; test scores; student critiques; and instructors' evaluations.

You would also want to track which courses an individual enrolls in and perhaps maintain a customized plan for the training needed at his job level. The plan should include courses the person needs but has not enrolled in. To measure the cost of training, a record of the student's salary at the time a course was taken would have to be maintained, as would any travel expenses.

It would also be important to keep schedules in your system. You would want to track which courses are available and their frequency. For in-house courses, you would want to know what room will be used and whether there are alternatives. You would want to know the instructor and assure there are no conflicts with his schedule. You would want to know what equipment is required, and again, avoid conflicts with other classes.

The concern with such conflicts implies that you must maintain a course inventory. This inventory could contain prerequisites for each course, the class length, who is capable of teaching it, any special equipment or software required and the preferred room layout.

In an ideal system, you could also maintain an inventory of course materials, the last time any maintenance was performed on them and the last time the course underwent a technical review to see that it conforms to the current corporate standards.

To handle registrations, you have to be concerned with in-house courses, public seminars and self study. If there are prerequisites, you want to know whether students are registered for courses in the proper sequence and the right time frame. What happens if students cannot attend courses as planned? The registration sequence should automatically change.

What happens when there are backlogs of students in overbooked classes? Is their entire training plan and schedule modified appropriately, or can you adjust the order of student registrations in a given class based on criteria determined by business needs?

How do you automatically adjust the whole sequence of schedules and the student registrations for canceled courses? Can you compensate for these cancellations by adjusting your schedule based on the student load in future classes?

How do you automatically notify both the students and their supervisors of all of this activity? How do you automatically keep the system clean and accurate with promotions, internal movement, turnover and replacements in the student population?

Your training management system requires some forecasting capability as well. Without a forecast of the courses you plan to deliver and an estimated student load spread over time, planning, budgeting and staffing becomes pure speculation at best.

In addition, without a training forecast, the corporation has no control over training as it relates to its bottom line, business needs and technologies. Not only is it necessary for a corporation to understand how much it is spending on technical training and for what purposes, but it is important that the organization is confident that it is spending the right amount.

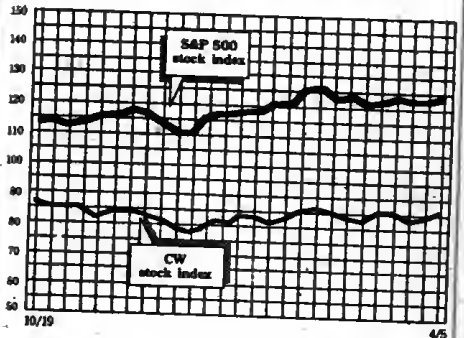
It is interesting to note that as necessary and generic as training management systems are, there are not that many available on the market. In most corporations, the systems operating today are either poorly maintained manual ones or homegrown automated systems that may not be documented, readily maintainable or transferable.

Well-designed training management systems will get the attention and the support they deserve as corporations move to strategic systems and begin to understand that their competitive advantage and productivity can stem directly from the quantity and quality of their technical training.

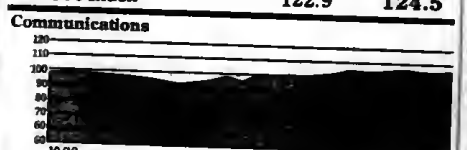
WITHOUT A TRAINING forecast, the corporation has no control over training as it relates to its bottom line, business needs and technologies.

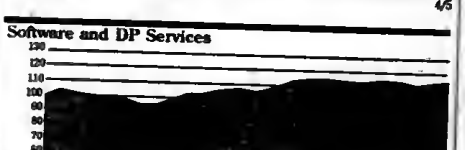
Sebrell is a vice-president at Data Base Management, Inc., a subsidiary of American Management Systems, Inc. in Manchester, Conn.

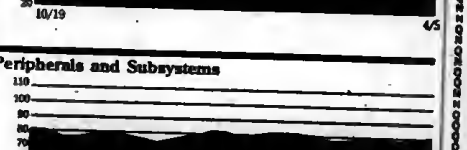
STOCK TRADING INDEX

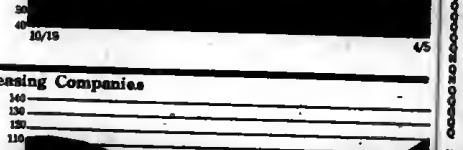


Indexes	Last Week	This Week
Communications	104.1	106.0
Computer Systems	90.0	89.9
Software & DP Services	111.5	113.4
Semiconductors	52.9	53.7
Peripherals & Subsystems	78.1	80.0
Leasing Companies	112.9	120.8
Composite Index	84.8	86.8
S&P 500 Index	122.9	124.5









Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, APRIL 5, 1989

Communications and Network Services

E		52-WEEK RANGE (1)		CLOSE APRIL 5, 1989	WEEK NET CHANGE	WEEK PCT CHANGE
N	AMERICAN INFO TECHS CORP	53	42	51.75	1.0	2.0
Q	ANDREW CORP	22	15	18	0.0	0.0
Q	ARTEL COMM CORP	4	1	2.5	0.0	0.0
N	AT&T	53	34	51.25	0.5	1.0
Q	AVANT GARDE COMP INC	3	0	0.438	0.0	0.0
Q	AVANTEK INC	8	4	0.438	-0.1	-12.4
N	AYDIN CORP	8	4	5.625	0.6	7.1
N	BELL ATLANTIC CORP	77	66	75.625	0.1	0.1
N	BELLSOUTH CORP	77	64	78.125	0.6	0.5
Q	COMPRESSION LABS INC	6	3	4.625	0.1	0.6
Q	COMPUTER NETWORK TECH	2	1	1.532	-0.1	-3.8
Q	CONTEL CORP	53	21	52.875	2.0	0.0
Q	DATA SWITCH CORP	9	6	8.375	0.3	4.9
Q	DIGITAL COMM ASSOC	28	17	17.875	-0.8	-4.0
Q	DYNATECH CORP	24	17	18	-0.3	-1.4
Q	FIBRONICS INTERNATIONAL INC	8	6	8	0.6	14.5
Q	GANDALF TECHNOLOGIES	8	6	4.625	0.8	18.4
Q	GENERAL DATACOMM INDS	8	3	5.75	0.0	4.5
Q	GTE CORP	45	34	45.375	0.0	0.0
Q	INFOTRON SYS CORP	18	6	9.75	-0.3	-2.5
N	ITT CORP	106	85	104.75	2.0	1.9
N	M/A COM INC	11	8	9.75	0.1	1.0
Q	MCI COMMUNICATIONS CORP	20	11	20.5	0.6	2.2
Q	NETWORK EQUIPMENT TECH INC	23	14	22	1.6	7.3
Q	NETWORK SYS CORP	12	6	8.625	-1.0	-10.0
N	NORTHERN TELECOM LTD	20	14	14.875	0.0	0.0
Q	NOVELL INC	28	19	28.75	-0.5	-1.2
N	NYNEX CORP	73	61	72	2.4	3.4
N	PACIFIC TELESIS GROUP	28	27	27	0.4	1.5
A	PEIRCE CORP	5	4	4.438	0.2	4.4
N	PLESSEY PLC	46	28	42.5	-0.6	-1.4
N	SCIENTIFIC ATLANTA INC	16	10	14.125	-0.5	-3.5
N	SOUTHWESTERN BELL CORP	46	34	44.25	-0.5	-1.7
Q	3 COM CORP	28	16	25.25	-1.0	-3.8
N	US WEST INC	63	50	62.875	0.4	0.6

Computer Systems

Q	ALLIANT COMPUTER SYS	6	3	3.25	0.0	0.0
Q	ALPHA MICROSYSTEMS	5	0	0.75	0.0	0.0
Q	ALTOS COMPUTER SYS	11	6	6.625	-0.1	-1.6
A	AMDAHL CORP	28	16	16.25	-0.5	-4.4
Q	APOLLO COMPUTER INC	17	7	7.875	0.1	1.9
Q	APPLE COMPUTER INC	48	34	37	0.0	0.0
Q	BOLT BERANEK & NEWMAN	16	8	9.375	0.0	0.0
Q	BRITTON LEE INC	4	2	2.75	-0.1	-2.2
N	COMPAQ COMPUTER CORP	76	47	70.125	0.4	0.6
Q	COMPUTER AUTOMATION INC	15	6	6.625	0.1	2.9
Q	CONCURRENT COMP CORP	6	4	4.5	-0.3	-6.5
Q	CONTROL DATA CORP	28	19	22.75	2.1	10.3
Q	CONVEX COMPUTER CORP	11	7	8.75	0.0	0.0
N	CRAY RESH INC	86	53	53.875	-0.9	-1.6
Q	DAISY SYS CORP	12	4	4.75	0.9	11.8
N	DATA GEN CORP	28	14	14.875	-0.5	-3.3
N	DATAPOINT CORP	6	3	3.625	0.1	2.8
Q	DELL COMPUTER CORP	13	7	7.25	0.0	0.0
N	DIGITAL EQUIP CORP	132	86	98.625	-2.4	-2.4
N	FLOATING POINT SYS INC	6	2	2.875	0.1	4.5
N	HARRIS CORP	32	28	28	0.3	0.9
N	HEWLETT PACKARD CO	68	44	52.375	1.8	3.7
N	HONEYWELL INC	77	57	60.5	4.4	6.7
N	IBM	121	105	107.75	-1.9	-1.7
Q	INFORMATION INTL INC	16	12	16.5	0.6	3.8
N	INTL SYS INC	7	1	6.125	0.0	0.0
N	MAI BASIC FOUR INC	21	7	7.625	-0.5	-6.5
N	MATSUSHITA ELEC IND'L LTD	214	160	194.5	-0.3	-0.1
Q	MEGADATA CORP	4	1	1.25	-0.1	-7.0
Q	MENTOR GRAPHICS CORP	27	23	81.9	0.0	0.0
N	NBI INC	7	1	1.9	0.0	0.0
N	NCR CORP	70	51	56.125	0.4	0.7
Q	PRIME COMPUTER INC	21	12	17.125	0.9	2.0
Q	PYRAMID TECHNOLOGY	20	10	12.25	-1.3	-9.6
Q	SILICON GRAPHICS CORP	22	14	16	0.0	0.0
Q	STRATUS COMPUTER	32	21	27.5	1.0	3.8
Q	SUN MICROSYSTEM INC	21	16	19.125	0.6	1.6
Q	SYMBOLICS INC	6	1	2.063	0.1	3.2
Q	SEQUENT COMPUTER SYS INC	27	14	23	-0.5	-2.1
N	TANDEM COMPUTERS INC	21	16	15.25	-2.4	-12.9
N	TANDY CORP	49	36	41	-1.6	-3.8
N	ULTIMATE CORP	15	6	9.625	-0.5	-3.5
N	UNISYS CORP	28	20	25.5	-0.5	-1.9
A	WANG LABS INC	15	8	8.25	-0.1	-1.9

Software & DP Services

Q	ADVANCED COMP TECH	4	1	2.75	0.0	0.0
Q	AMERICAN MGMT SYS INC	20	12	16.375	1.9	12.0
N	AMERICAN SOFTWARE INC	21	12	20.375	0.5	2.5
Q	ANACOMP INC	12	5	9	-0.1	-2.0
Q	ANALYSTS INTL CORP	18	7	17	0.0	0.0
Q	ASHTON TATE	30	18	18.625	-0.1	-0.5
Q	ASK COMPUTER SYS INC	18	12	12.375	-0.9	-4.5
N	AUTODESK INC	34	23	30.25	1.0	3.4
N	AUTO DATA PROCESSING	46	29	37.375	1.0	2.7
Q	BMC SOFTWARE INC	17	6	17.375	1.4	8.8
Q	BOOLE & BABBAGE INC	15	6	15.75	0.9	1.8
Q	BURR-BROWN CORP	15	6	11.5	0.1	1.1
Q	COMPUTER ASSOC INTL INC	46	24	32.75	-2.0	-5.8
Q	COMPUTER HORIZONS CORP	12	7	8.25	0.1	1.9
Q	COMPUTER SCIENCES CORP	56	36	48.75	-0.4	-0.8
Q	CORPORATE SOFTWARE	15	6	6	0.0	0.0
N	COMPUTER TASK GROUP INC	17	10	14.75	0.4	2.8
Q	COSMOS INC	4	0	7.25	-0.1	-1.7
Q	COMSHARE INC	28	15	25.75	-0.5	-1.9
Q	MANAGEMENT SCIENCE AMER	6	4	5.25	0.0	0.0
N	GENERAL MTRS (CL E)	47	37	44.5	1.0	2.6
Q	HOGAN SYS INC	4	0	5.75	0.1	1.9
Q	INFORMIX CORP	25	7	10.625	0.0	0.0
Q	INTELLICORP INC	4	2	3.469	0.1	1.7
Q	KEANE INC	28	4	28	2.0	8.0
Q	LEGENT CORP	24	16	22.375	0.8	3.9
Q	LOTUS DEV CORP	28	15	19.75	-0.5	-2.5
Q	MANAGEMENT SCIENCE AMER	14	6	6.375	-0.5	-3.8
Q	MICRO PRO INTL CORP	4	2	2.063	0.0	12.8
Q	MICROSOFT CORP	71	46	90.375	0.0	1.8
Q	NATIONAL DATA CORP	20	19	20	1.4	8.2
Q	ON LINE SOFTWARE INTL INC	11	4	8	0.0	0.0
Q	ORACLE SYS CORP	28	16	24	-0.8	-1.5
Q	PANSOPHIC SYS INC	18	12	16.75	-0.8	-4.1
Q	PHOENIX TECHNOLOGIES INC	16	12	16.25	0.0	1.8
Q	POLICY MGMT SYS CORP	27	21	24.25	2.0	9.0
Q	PROGRAMMING & SYS INC	15	10	13.75	-0.5	-1.9
Q	RABBIT SOFTWARE INC	3	2	1.813	0.1	3.6
Q	RELATIONAL TECHNOLOGY INC	21	12	13.375	0.4	2.9
N	REYNOLDS & REYNOLDS CO	20	17	20	0.9	3.2
Q	SEI CORP	22	09	18.625	0.0	0.0
Q	SHARED MED SYS CORP	28	14	17.75	-0.5	-1.4
Q	SIMS SOFTWARE INC	10	6	8.625	0.0	0.0
Q	SOFTWARE PUBLICORP	27	15	16.5	1.4	9.0
A	STERLING SOFTWARE INC	8	4	6.875	-0.5	-4.1
Q	SUNGARD DATA SYS INC	20	15	14.75	1.9	11.3
Q	SYSTEMATICS INC	20	28	28.25	1.6	2.9
N	SYSTEM CENTER INC	21	12	20	1.1	0.0
N	SYS. SOFT INC	26	6	19.5	-0.9	-3.7

Semiconductors

N	ADV MICRO DEVICES INC	17	7	8.625	0.4	4.5
N	ANALOG DEVICES INC	16	10	10.75	0.9	2.4
Q	ANALOGIC CORP	20	8	8.125	0.1	1.4
Q	CHIPS & TECHNOLOGIES INC	21	11	14.75	-1.3	-7.9
Q	INTEL CORP	37	18	25.375	0.6	2.9
Q	LSI LOGIC CORP	14	6	10	0.3	2.9
Q	MICRON TECHNOLOGY INC	28	15	16.75	0.0	0.0
N	MOTOROLA INC	59	39	42	1.1	2.9
N	NATL SEMICONDUCTOR	15	7	7.5	0.0	0.0
N	TEXAS INSTRS INC	56	35	38.875	0.6	1.6
A	WESTERN DIGITAL CORP	17	11	15	0.6	3.9

Peripherals

Q	ALLOY COMP	5	3	3.125	0.0	0.0
N	AM INTL INC	8	3	6.125	0.0	0.0
Q	ARI RESH INC	17	7	7.25	0.4	5.8
Q	AUTO TROL TECH CORP	15	4	6.125	-0.1	-2.4
Q	BIANCTEC INC	18	8	11.375	-0.3	-2.2
Q	CIPHER DATA PRODS INC	11	5	6	0.0	0.0
Q	COMPUTRONICS CORP	5	2	3.875	-0.1	-3.1
Q	COMNEX PERIPHERALS	10	7	7.5	0.9	13.2
A	DATAPRODUCTS CORP	18	6	10.75	-0.5	-1.8
A	DATAVIAN CORP	8	7	6.375	0.1	1.9
N	EASTMAN KODAK CO	85	38	48.625	1.5	2.9
N	E M C CORP MASS	18	2	3.125	-0.5	-16.7
Q	EMULEX CORP	12	6	6.375	0.1	1.2
Q	EVANS & SUTHERLAND	21	13	17.75	0.4	2.3
Q	IDOT CORP	4	2	2.875	0.0	0.0
Q	INTERLEAF INC	12	6	9.75	0.1	1.3
N	IOMEGA CORP	25	6	9.75	-0.5	-5.4
Q	LEE DATA CORP	4	2	2.875	0.8	38.4
Q	MAGNETOR SYS CORP	4	2	2.375	-0.6	-7.9
Q	MAXTOR CORP	4	2	2.375	0.3	11.8
Q	MICROPOLIS CORP	16	6	8.875	0.0	2.9
Q	MINISCRIBE CORP	28	6	7.25	1.0	16.0
N	MINNESOTA MNG & MFG CO	14	8	3.688	0.0	0.0
Q	PERSONAL COMPUTER PRODUCTS INC	70	57	66.875	-0.8	-0.8
Q	PRIAM CORP	7	4	4.313	0.1	1.3
Q	PRINTRONIX INC	2	1	1	-0.1	-11.1
Q	QMS INC	11	7	8.625	-0.8	-8.8
Q	QUANTUM CORP	12	6	7.9	-0.8	-9.1
Q	RECOGNITION EQUIP INC	19	10	17.25	1.3	7.9
N	REXON INC	12	6	9.875	1.1	12.8
Q	SEAGATE TECHNOLOGY	8	4	5.625	-0.4	-6.8
Q	STORAGE TECH CORP	23	7	12.125	0.8	6.8
Q	TANDON CORP	4	1	2	0.0	0.0
Q	TEKTRONIX INC	2	1	0.816	-0.1	-7.1
N	TELEVIDEO SYS INC	28	14	20.875	0.0	0.0
N	XEROX CORP	1	0	0.344	0.0	-8.8
		67	50	58.375	0.6	1.1

Leasing Companies

Q	AMPLICON INC	20	13	16.8	-1.3	-7.0
N	CAPITAL ASSOCIATES INTERNATIONAL INC	6	4	6.0	0.4	4.2
N	COMDISCO INC	28	16	22.875	0.0	0.0
Q	CONTINENTAL INFO SYS	4	0	1.25	0.0	4.0
Q	LDI CORPORATION	17	10	16.25	0.0	42.9
Q	PHOENIX AMERICA INC	5	0	3.375	0.1	3.8
Q	SELECTERM INC	8	4	7.125	-0.5	-9.0

EXCH—N=NEW YORK A=AMERICAN Q=NATIONAL

Wild world

Prices keep falling as unmet expectations pull shares down

In the wake of recent stock shocks from IBM, Digital Equipment Corp. and Unisys Corp., high-tech investments last week seemed to be going by the book — in this case, *The World According to Garp*. In John Irving's novel, both hero and reader get so conditioned to downers that the question becomes not whether there will be s next disappointment, but when it will occur.

It looked last week as if Tandem Computers, Inc.'s second-quarter revenue growth, while significant, would underperform Wall Street expectations, largely because of a European sales shortfall. Tandem stock closed Thursday at 14⅛, down 2⅜ points.

IBM's midweek product debuts did not keep its falling stock from losing an additional 1¼ points by Thursday; it closed at 108. DEC, last seen inching upward, slid back 2½ points to a Thursday close at 96.

Sungard Data Systems, Inc.'s stock slipped on the strength of IBM's announcement of its imminent entry into the disaster recovery market. Investors, however, opted for Sungard's "market validation" spin on the IBM entry. Sungard closed at 14½, up ¼ of s point from the week's start.

NELL MARGOLIS'

3090

FROM PAGE 1

February, IBM came out with a low-end S model, ESA software enhancements and price cuts on central and expanded storage. At that time, users reported that they would eventually move to ESA and the high-end mainframes, but the IBM announcement did not change their schedules.

Not enticed

"My feelings remain static," said George DiNardo, an executive vice-president at Mellon Bank NA in Pittsburgh. "I upgraded to E's because it was economical. I will buy a bigger machine when I need one."

While IBM maintained that it is pleased with the number of ESA recruits and S model shipments, the company is certainly working hard to increase those figures.

The newest S model, the 3090 Model 380S, features an asymmetrical capability, the latest treat offered for S users. The multiprocessing system is split with two processors on one side and one on the other.

The 3090 Model 380S is scheduled to be available in November with a starting price of $7.9 million.

IBM reported that other multiprocessing S models will be able to run the asymmetric capability later in the year. The feature will not be provided to E model users, according to Peter Tarrant, director of large-systems marketing and enterprise systems at IBM.

A matter of balance

The asymmetrical feature reportedly allows users to configure expanded storage and channels on both sides of the 3090 processing complex whichever way they want.

Previously, users had to balance the same amount of both expanded storage and channels on each of the two sides.

According to IBM's Tarrant, the asymmetrical capability can save users money, particularly in the case of expanded storage. In the past, customers had to buy the same amount of expanded storage for each processor side, no matter how much they really needed.

"We'll likely take them up on this," said John Wood, director of computer operations at the Royal Bank of Canada's headquarters in Toronto.

"We don't need a 380S, but we'll be putting in a couple of 500s, and I'd like to make them asymmetrical," he added.

A deal on storage

IBM's price break on memory last week was the third time in two months that those price tags have been trimmed. The latest promotion offers customers discounts in the 20% range for both central and expanded storage if they buy before September.

In February, IBM reduced the prices by 11% for the initial expanded storage purchase and 17% for additional increments. Central storage was cut by 9%. At the same time, it offered customers another $50,000 off total memory costs if they made their purchase by June. The latest promotional deal replaces this one.

When asked if the 20% promotional deal was enough incentive to make a purchase, Louis Mickler, data center manager at Pacific Telecomm, Inc., said, "It sure would be if we needed it. We just went from a 200E to a 400E and doubled our real memory. We don't have a need for expanded storage right now."

IBM rallies with recovery service

BY JAMES DALY
CW STAFF

ARMONK, N.Y. — IBM unveiled plans last week to tap into the rapidly emerging disaster recovery market with a backup contingency service it will begin offering immediately.

IBM said its Business Recovery Services will be available on a limited basis and will provide midrange and large systems users with access to a recovery center for recovery-plan testing and disaster recovery operations.

IBM has long been rumored to have its eye on a full-blown entry into the disaster recovery business but has previously only dabbled in the market. IBM Germany offers a mobile disaster recovery setup, while domestically the firm offers classroom training and consultancy, albeit on an individual basis.

"More and more of our customers are telling us that disaster recovery plans are a vital part of their business that they cannot function without," said Jim Boyle, an IBM division vice-president who will be in charge of the operation.

IBM has little to lose on the venture except a bit of red ink. The firm has recently been forced to formulate some disaster recovery of its own. Domestic business has been off, third-quarter financials are not expected to meet early predictions, and IBM has increasingly turned to the services market to help push its $50 billion annual revenue boulder uphill.

Well-publicized calamities such as a fire at a telephone-switching station near Chicago last May that knocked out more than 150,000 computer-to-computer connections have turned the disaster recovery market into a mother lode.

The trend toward contingency planning — which has been spurred by government regulations requiring firms with federal contracts to have such plans — will cause the market to grow 20% annually until it pops the $1 billion mark in 1995, said a study by The Ledgeway Group.

Untapped overseas potential is also great in markets such as the Far East, where interest in contingency planning is just beginning to secure a beachhead.

Hot sites

IBM will employ two large systems hot sites — one in Tampa, Fla., and another in Franklin Lakes, N.J., that is scheduled to open by the third quarter — as well as a dozen regional sites for smaller midrange system backup. Service will be provided for IBM machines ranging from the Application System/400 line through the 3090 Model 600, Boyle said.

Customers will be charged a monthly fee, from $500 for backup on the low end of the AS/400 line to $45,000 for backup on a 3090 Model 600. Users may subscribe to the service for one, three or five years. Initially, service will only be provided to IBM or IBM-mixed sites, Boyle said.

Other disaster recovery-service vendors said they did not feel threatened by the IBM move because the market still affords plenty of elbow room. "We think it will be a boost for all of us," said John Butch, a division manager of Hotsite, which provides disaster recovery services for IBM midsize mainframes.

9370 clearer target for 8100 users

BY STANLEY GIBSON
CW STAFF

IBM released Version 2 of DPPX/370 last week, touting the operating system for new users as well as those migrating from IBM 8100 systems.

DPPX/370 was announced last year as a migration platform for 8100 users converting to the Enterprise System/9370. Version 1 bowed in December 1988.

Although IBM is seeking to reach out to new customers with DPPX/370, its appeal is limited mainly to a distributed processing niche in which an MVS-based IBM host controls a number of remote IBM 9370 systems.

The company encourages 8100 users to migrate to the IBM 370 architecture using DPPX/370, even though the operating system will only run on the ES/9370 and not other 370 architecture systems such as the ES/4381. DPPX/370 is also outside of IBM's Systems Application Architecture, the firm's grand plan to offer consistency across its disparate computers and operating systems.

Among the enhancements in Version 2 are the following:

- Support for Personal Services/DPPX and Displaywrite/DPPX, which offer interfaces similar to MVS versions of those products.
- Support for Systems Network Architecture Distribution Services, Document Content Architecture and Document Interchange Architecture.
- Support of both 16M bit/sec. and 4M bit/sec. versions of the IBM Token-Ring network.

IBM promised more enhancements to DPPX/370 and reiterated its intent to provide larger and smaller 9370 systems.

Bill Falconer, president of PS Technology, Inc. in Denver, a developer of DPPX-based railroad management applications, said he is selling his package to new 9370 customers as well as migrating 8100 users.

DPPX offers remote maintenance features that other 9370 operating systems such as DOS/VSE do not, the developer claimed. "DPPX can run at a site with no operator. It is more compact and easier to use than VM," Falconer said.

Carl Wohlers, IBM product administrator for DPPX/370, also praised DPPX's distributed processing features, which he said were ahead of those offered by other operating systems. He added that DPPX still has deficiencies, such as the lack of a relational database management system. Therefore, many users may continue to prefer VM.

ES/9370 face-lift

Never say die. Apparently, that is IBM's thinking when it comes to its lackluster Enterprise System/9370. The low-end mainframe line got another face-lift last week with a new low-end model and an enhanced Model 50.

Both the old low-end, the Model 20, and the old Model 50 will be discontinued in July. Though it will not be killed outright, the Model 60, which will overlap the performance of the new Model 50, will be offered on a limited basis only.

The Model 25 will provide about 2½ times the performance users got with the Model 20, according to IBM. The new Model 50 clocks in with about 26% more power than the old version.

With such a boost to the low end, the Model 25 is now rubbing up against the performance of the Model 30.

"The raw processing power is roughly comparable, but that's only part of things," said Rae Albertini, director of midrange systems 370 marketing at IBM. "The 30 continues to have better I/O throughput."

ROSEMARY HAMILTON

Power options

The Model 25 adds a punch to the low end of IBM's 9370 line

Price	$26,250
Main memory	4M to 16M bytes
Maximum storage	368M to 13.1G bytes
Peripherals and subsystem attachments	Up to: • Two 370 channels, • Four DASD/tape units, • 12 Workstation subsystem controllers, • 15 Communications processors
Relative performance	2.5 times the Model 20
Availability	May

SOURCE: IBM — CW CHART: JOHN TOHE

Take a peek: VM runs on a PS/2

BY JEAN S. BOZMAN
CW STAFF

IBM is quietly showing off the smallest expression yet of its 370 architecture at user group meetings from Boston to Los Angeles. The as-yet-unannounced product is a five-card 16M-byte system that runs IBM's VM/SP Release 5 in its entirety.

However, the box, priced at $18,000 per unit, is only being sold in quantities of 25 or more through special bids to customers with VM/SP licenses, according to IBM. It is also being marketed as a single-user-only workstation to distinguish it from the lower end of IBM's 9370 line.

Although the 7437 will remain an unannounced IBM product, it will be present at the IBM booth at Comdex/Spring '89 this week, IBM said. At the same time, IBM is reportedly considering whether it will sell the 7437 machine in single units rather than in lots of 25. No price has yet been set for a single-unit sale, according to Gary L. Smith, manager of market development for the 7437 in Poughkeepsie, N.Y.

Industry sources said IBM's quiet promotion of the system is designed to avoid conflict with the slow-selling 9370. In the three years since the 9370's introduction, "the price/performance of hardware has improved by a factor of two," said one East Coast developer. "That's a little too quickly for IBM's purposes, so IBM has artificially limited the marketing of the 7437."

Nevertheless, IBM has made 7437 presentations at last month's Share, Inc. user group meeting in Los Angeles, the New England VM Users Group meeting in February and other user meetings early this year. The 7437 has also been used by IBM and by Cadam, Inc. at trade shows to demonstrate mainframe VM applications since late 1988.

"What we've determined from the marketplace is that there are some users who are excited about the product," Smith said. "Unlike its predecessors, the IBM XT/370 and the AT/370, it runs the full VM/SP Release 5 unmodified. The others ran a subset of VM, and they were not multitasking."

At its user group presentations, IBM said the 7437 was, in effect, a 0.7 million-instruction-per-second coprocessor for its Personal System/2. As such, it uses the PS/2's Micro Channel Architecture to reach into the host mainframe for the VM application and data on the host's disk drive and a onetime download of the VM operating system. It is installed side-by-side with a standard PS/2 Model 60 or 80 and requires more than 100M bytes of disk storage.

They've been waiting

VM software developers said they have been waiting for a practical desktop version of VM for some time. However, large numbers of VM developers might be better served by a single IBM 4381, which can serve 50 or more programmers for about $100,000, according to several software developers who had not yet seen the 7437.

"Individual workstations have only limited use in a software development environment," said Peter Kronenberg, VM systems programmer at Information Builders, Inc., a New York-based software firm. "It's hard to be disconnected from other VM/CMS users on the same mainframe." Information Builders evaluated the earlier AT/370 and XT/370 desktop systems and returned them to IBM, Kronenberg said. His firm has not yet evaluated the 7437.

As currently marketed, the 7437 is targeted at single users of such technical programs as Lockheed Corp.'s Cadam computer-aided design and manufacturing software. Technical users of 370 mainframe applications can boost performance of some graphics-intensive programs by running them on a dedicated 7437, IBM said. That would differentiate the 7437 from IBM's RT workstation, which is directed at the Unix market, the company added.

One satisfied customer is Lockheed, which bought 25 IBM 7437s this year. "For the first time, we have a compact and convenient tool to take with us to trade shows and to client sites," said David Brazier, vice-president of marketing at Cadam Corp. in Burbank, Calif. "Until now, we had to set up 9370s at the shows, which required more space and more cooling. We were unable to demonstrate Cadam at many of our regional sales offices except in Denver and Detroit, where we had 9370s installed."

IBM shaves PS/2 prices

WHITE PLAINS, N.Y. — IBM reduced the prices of its popular Personal System/2 Model 50Z and Model 70 systems last week and also introduced a new version of the low-end Model 30.

The 50Z was reduced in price by 20%, bringing a 30M-byte fixed-disk system down to $3,250; the price of a 60M-byte fixed disk system came down to $3,650. The Model 70 with a 60M-byte hard disk was shaved 8% to $5,494.

IBM also introduced a PS/2 Model 30 for $1,695 with one diskette drive and storage options, including a second diskette drive, a 20M-byte hard drive or a $950 30M-byte hard drive.

EDI software package rounds out IBM's line

BY ELISABETH HORWITT
CW STAFF

WHITE PLAINS, N.Y. — IBM last week achieved its goal of becoming a full-source provider in the burgeoning electronic data interchange (EDI) market with the announcement of software that translates a variety of business documents into standardized EDI formats.

The IBM Expedite Data Interchange software series supports all of the vendor's Systems Application Architecture systems, IBM said. By translating proprietary formats to EDI standards such as ANSI X12 protocols, the software product permits business documents to be exchanged electronically, speeding communications between business partners such as manufacturers, suppliers and distributors.

The software offerings complement EDI services currently offered by IBM Information Network, a value-added network service based in Tampa, Fla. IBM already offers the Expedite Communicator Series, which support a variety of communications interfaces — including a direct link to Information Network via a Remote Job Entry link.

"You don't have to use Communicator to access Information Network, but obviously IBM would prefer you did," company spokesman Andrew Russell said.

Ace Hardware Corp., an Oakbrook, Ill.-based hardware retail chain, currently uses Information Network to communicate with its dealer-owned stores and is thinking about using the service for EDI as well, according to Don Schuman, Ace's director of information services. Ace, along with a number of other hardware retailers, currently uses EDI software and services provided by Sterling Software, Inc.'s Ordernet Services division but is thinking about moving to a less expensive, X12-based service, Schuman said.

The total EDI market will skyrocket to $1.9 billion by 1993, according to Mountain View, Calif., research firm Input (see chart at right). But while EDI services are signing up new customers in droves, network traffic is still light, according to Mark Winther, director of communications services at New York research firm Link Resources Corp.

Link projected that the third-party EDI services market will grow from $90.7 million this year to $316.2 million in 1992. On the other hand, EDI software is already in great demand, as users implement EDI as part of their just-in-time and quick-response systems, Winther said. "IBM's move is a good one," he concluded.

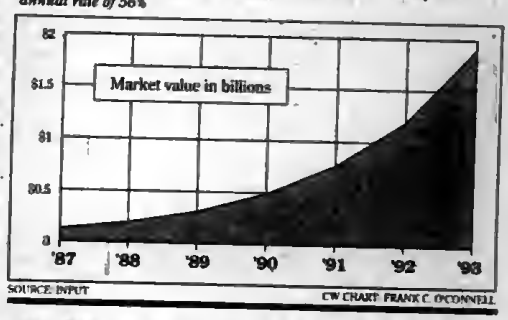
Still, IBM will have to differentiate its products from an already-crowded market, Winther added. One important issue is how well IBM will be able to identify and address the EDI needs of specific business sectors, he said.

IBM announced last week that its Systems Integration Division will be offering EDI consulting, education and systems integration as well as turnkey offerings. The vendor will also provide EDI integration through value-added resellers in its Business Partners program, IBM's Russell said.

The Expedite Data Interchange series is said to provide translation into the U.S. EDI standard and X12, as well as Edifact standards that are backed by the United Nations as a way to converge U.S. and European EDI standards, IBM said. Software will be provided for the IBM Personal System/2, Application System/400, System/38 and IBM MVS/ESA and MVS/XA mainframes, with a VM version to come. Availability dates range from immediately for the MVS/XA version, priced from $14,750 to $38,000, to the first quarter of 1990 for the PS/2 version, which is priced at $4,000.

Booming expectations

The market for EDI products is projected to increase at a compound annual rate of 56%



SOURCE: INPUT
CW CHART: FRANK C. O'CONNELL

Second-class postage paid at Framingham, Mass., and additional mailing offices.
Computerworld (ISSN 0010-4841) is published weekly, with a single combined issue for the last week in December and the first week in January of 1989 by CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171.

Computerworld can be purchased on 35 mm microfilm through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106. *Computerworld* is indexed: back issues, if available, may be purchased at $2.00 per issue, plus postage. Call (800) 669-1002.

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TRENDS

IBM's DOS/VSE

For IBM, DOS/VSE may be both a dream come true and a nightmare.

Despite rumors that company management longs to sign the operating system's death certificate, DOS/VSE — IBM's aging flagship system for small and mid-range machines — is thriving amid a young crowd of contenders, according to Jerry Berry, an analyst at Computer Intelligence in La Jolla, Calif.

To say simply that DOS/VSE has been a success would be an understatement.

Although its installed U.S. operating systems license base has slipped from 44% in 1984 to 35% this year, DOS/VSE remains the most widely used operating environment on IBM mainframes. Since 1984, the number of DOS/VSE licenses has climbed more than 10%.

However, at a time when IBM is soliciting conversion to its brassier MVS and MVS/ESA, sustaining the life of DOS/VSE does not make great financial sense.

MVS is the better revenue reaper for IBM, wielding higher one-time and monthly license fees. And in some cases, Berry pointed out, users must upgrade hardware and buy extra software to run MVS effectively.

So far, IBM has had little success with this migration. In 1984, 73% of installed DOS/VSE systems ran in native mode, while 24% ran as guests under VM and a paltry 3% ran together with MVS under VM. The latter is the configuration users would choose if they were to convert to MVS.

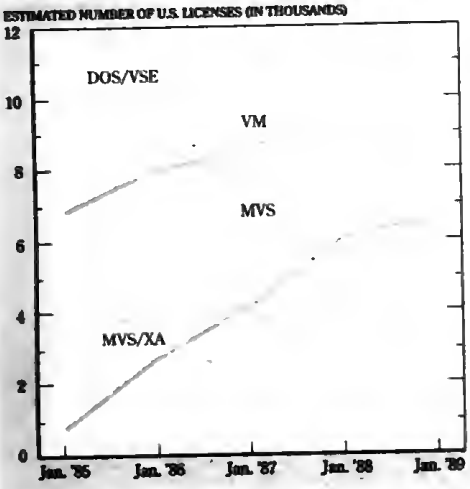
In the ensuing years, the portion of DOS/VSE systems running native shrunk, but the switch favored running DOS/VSE under VM alone. The percent of DOS/VSE systems running with MVS inched up to 5% and got stuck there.

At 5% again in 1989, that comes to only about 570 systems configured in such a way. As Computer Intelligence figures it, even if 90% of those systems were to convert to MVS each year, it would take more than 22 years for the current DOS/VSE base to migrate.

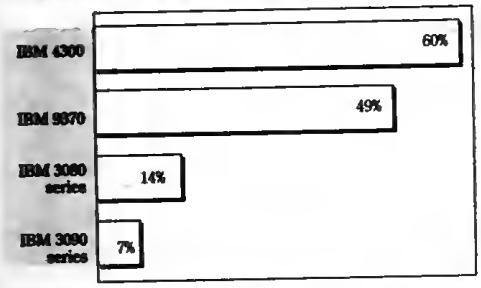
DOS/VSE users are not heading toward MVS quickly. In fact, in the last year, native DOS/VSE systems returned to an upswing. So if IBM wants to phase out DOS/VSE, it must either replace the operating system entirely or spruce up the option of MVS migration.

LAURA O'CONNELL

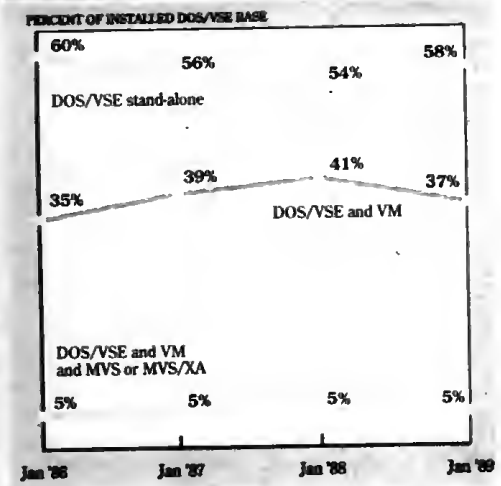
DOS/VSE retains a loyal user base



Penetration greater on smaller systems



Native mode makes a comeback



SOURCE: COMPUTER INTELLIGENCE

CW CHART: JOHN YORK

INSIDE LINES

Merger maven turns inward? Computer Associates will announce something later today, but Sanjay Kumar, vice-president of product planning, wasn't providing any clues last week. Kumar would not confirm or deny internal and external reports that the company will merge its SPD and IPD divisions, which were formed after the company acquired Applied Data Research. "We pushed back the announcement because we wanted to make sure that all of our employees knew all the details before we announced it to someone else," he said, declining to specify what announcement he was referring to. Several sources, who requested anonymity, said the reorganization will bring 10% to 12% layoffs in both service and support and sales. If mum's the word at CA, so is ISPD, the trim new name of the combined SPD and IPD divisions, sources said.

Apple, of course, can do better. Apple engineers are said to be less than thrilled with 3Com's initial design of Apple's Ethertalk card; Apple thinks it can do better and has assembled a team to look into the matter. One idea is to build Ethertalk onto the Mac's motherboard, said a source close to the project team. This capability could work well with a Motorola 68030 but requires a higher clock speed than Apple now offers (16 MHz). On the Digital side of Ethernet, Apple and DEC have slated a May 8 briefing — also the first day of Apple's developers conference. The agenda features an Apple/DEC Communications Toolkit seminar, so it's a good bet the product will be unveiled then.

No copyright on ad copy? Executives at Access Technology, makers of the 20/20 spreadsheet package, are miffed at claims being made by Lotus in its promotional literature touting 1-2-3 Release 3.0. Lotus claims the yet-to-be-shipped Release 3.0 is the only spreadsheet that will be available across a range of environments with consistent commands, simplifying training and support for users. Access said 20/20 has had those features for several years and now seeks to have Lotus pull its literature out of distribution here and in Europe.

ISDN — In Search of Demand Now. Count MCI among the ISDN skeptics, at least in the short term. Dick Liebhaber, MCI's executive vice-president, said he hasn't seen much user demand for ISDN's Primary Rate Interface, although MCI is technically prepared to offer it if customers do want it. He said the only ISDN service in demand is Automatic Number Identification, which MCI is preparing to offer as a separate feature unrelated to ISDN.

Success or sayonara. The supercomputing market should take an interesting twist this week when Japan's NEC announces a high-powered machine that will reportedly blow by any U.S.-made competition. Sources say NEC's machine, dubbed the SX-3, will attain a performance of 22 billion floating-point operations per second and utilize the Unix operating system.

Pulling in the NET. Network Equipment Technologies is expected to announce this week everything but the kitchen sink in an effort to plug up its weak spots in a no-holds-barred T1 market. A spokeswoman confirmed NET will be announcing expert systems-based network management; the IDNX/10, which will fill in a yawning NET gap at the low end; and fractional T1 services, which will target even smaller sites that need less bandwidth than full T1. Several industry sources said they also expect to see NET expand on its plans for 45M bit/sec. T3 links as well as its relationship with local-area network bridge vendor Cisco Systems.

It was the Great Kahn who pulled off the PC Forum coup. Borland's president slipped under attendees' doors (read on, obviously Philippe couldn't fit himself) a magazine featuring a story that cast aspersions on Lotus Chairman Jim P. Manzi. Kahn telegrammed Manzi and apologized twice for having "crossed the line in what is considered to be acceptable competitive marketing tactics." You trickstars out there don't have to slink to such depths; just call the hot line at 800-343-6474 or 508-879-0700, or contact News Editor Pete Bartolik on the CW electronic bulletin board at 508-626-0165, 508-626-0214 or 508-626-0235.

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